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MYERS ARITHMETIC

ELEMENTARY

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MYERS ARITHMETIC

ELEMENTARY

BY

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COLLEGE OF EDUCATION, THE UNIVERSITY OF CHICAGO

CHICAGO
SCOTT, FORESMAN AND COMPANY
1909

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PREFACE

Recent years have seen many substantial gains in both theory and practice in elementary education. Arithmetic has gained largely from this general advance. In teaching the elements of mathematical science we have learned of late many practicable ways of attaining the larger educational aims; viz., strengthening the judgment and the will, and fostering the power to think and to do.

PLACE FOR FORMAL STUDY.

There is no school subject in which foreshortened views and distorted perspective work more harm than in elementary mathematics. Children, as well as adults, learn new ideas by meeting them first in simple forms, intermingled with familiar ideas and *fairly well-understood uses* of the new ideas. After a little, the new idea makes itself felt as something new. This is the time to differentiate it for formal study, to learn what it really is. This is the stage for the *study of process* and *for drill* enough to impress it and to make its use easy and facile.

The learner then desires to experience the added power the mastery of the process has given him, and this calls for the *application stage*. The treatment of new ideas, processes, and topics in this book is accordingly arranged on this three-fold plan of (1) *its informal use*, (2) *its formal study*, and (3) *its application*. Examples of this plan may be seen in the teaching of the tables.

The arrangement of number work for the grades must be in accordance with the natural unfolding of the child's mind. Too often this important fact is lost sight of in the logic of the subject itself. Strictly speaking, there can be no contradiction between the demands of the child's

mental development and the logical requirements of the subject. It is only when logic is construed to mean *the procedure of adult mind* that the demands of logic become mischievous in the elementary school. Rightly understood, logic means the natural procedure of the learning mind in mastering a subject. Recent work of educational experts has proved that the best nurture for the child *as a child* remains always the best nurture he could have had. In the language of biological science, while the frog is a tadpole, whatever is best for the tadpole will eventuate in the most perfect frog.

ORDER OF DEVELOPMENT.

This doctrine is now generally accepted by all students of education. It has done much toward the general accrediting of childhood at its true worth. It has given flat and final denial of the right to quarrel with the child because he is not something else, by attempting to force upon him the logic of the adult. This modern doctrine is accepted by this book. It is believed the book has unified the interests of logic with those of the child by making its logic *the logic of the learner* at the stage he has reached.

The ideas of number and of the numerical processes must be derived from the concrete. Form and number are the two main developments of quantity. The process of numbering in its varied aspects is very closely paralleled in the physical world by the process of measuring in its varied applications. This does not imply that numbering and measuring are one and the same process, or set of processes. What it does imply is that numbering is the mental side of the same problem of adjustment of activity that has its physical expression in measurement. It means that measurement is the most direct and certain route to correct notions of number, for one who has not yet acquired them.

MATERIAL.

The MYERS ELEMENTARY ARITHMETIC organizes the material of modern elementary school mathematics into four parts. Each part after Part I, contains a full year's work for a public school of average possibilities for arithmetic work.

Part I is an introduction of a dozen pages of exercises and simple, practical problems about every-day affairs. They are drawn from sources with which the pupil's experiences, in and out of school, have familiarized him in an indefinite way, and for the right understanding of which the use of numbers and of arithmetical processes is needed. These introductory pages will perform three important services to arithmetic teaching, viz:

(1) They start the notions of number and its processes as apt ways of expressing mental needs, inwardly demanded, rather than outwardly impressed. (2) They bring together and put into the child's control the scattering items of number knowledge, that have been gleaned, in school and out, through the first and second grades, and digest these facts into a sort of system. (3) They assist the teacher to know what the pupil has already learned and how and where to begin the next advance.

These pages are not a full year's work. They are rather a body of detailed suggestions, readily capable of being amplified into an entire year's work for the second grade.

Part II is for the third grade. It begins by impressing the pupil with the need for estimating and measuring, by giving him considerable work in indefinite comparison, leading to definite comparison, measurement, and numbering. This work, while interesting in itself to children, is done not so much for its own sake, as to supply a rich groundwork of number judgments for arithmetical number and process. The year's work includes many of the uses of number that gather about the common standards and processes of measurement, and makes a

sure and sound beginning on the tabular machinery of arithmetic.

Part III, for the fourth grade, completes the work on the tables, gives a wide range of applications to easy and useful matters of common experience, and considerable practice in choosing processes and in estimating what results must be. Estimated results are then checked by calculating, and drill on the fundamental processes is continually kept up.

The aim of Part IV, for the fifth grade, is to strengthen the grasp of arithmetic that is already secured, to give a measure of control of connected thinking, of inference-making, and to add appreciably to the pupil's ability to work independently. More particularly, this book seeks to expand the child's horizon of number to include fractional number, and to extend his control of the four fundamental operations to fractional number, both common and decimal. Long division, with its complicated technique is thoroughly taught in Part IV. Considerable systematizing of the pupil's knowledge of common fractions, together with a reconnoitre of decimals, and a forecast of percentage are also included in this part.

USE OF MATERIAL.

There are numerous lists of problems involving real measurement, and incidentally also counting, at its best. These lists are carefully graded, and the teacher is urgently recommended at all times to have pupils solve *all they can orally*. The pencil and paper should be used only when the difficulties of the problem make it too hard for the pupil to do orally Different pupils show very different degrees of aptitude for rapid oral work. No plan of isolating the oral from the written work can suit the varying needs of different pupils, and every pupil has a right to the best sort of training of which he is capable. The problems of life are handled in this way, and the pupil should early form the habit of

using his head as much as possible and his pencil only *as an aid to his head.*

CHOOSING PROCESSES AND FORMING ESTIMATES. TESTING.

It is also recommended that teachers follow the practice of having pupils work rapidly through many of the lists of problems, indicating the processes called for and giving and recording estimates of about what the answers must be *before any figuring is done.* Then the problems should be worked through and the correct results compared with the estimates. This work is of high value as training of judgment and as aiding the pupil to know *when,* as well as *how,* to add, subtract, multiply, or divide.

THE TABLES.

By associating parts of the multiplication table with certain facts of the denominate number tables, both sets of facts may be learned at once, and more easily than either may be learned alone. For example, the 2's may be based on the fact, 2 pt. = 1 qt.; the 3's on 3 ft. = 1 yd.; the 4's on 4 gi. = 1 pt.; 4 pk. = 1 bu.; 4 qt. = 1 gal.; the 5's on 5c = 1 nickel; 5 nickels = 1 quarter; on the divisions of the clock-face, the number of school days in a week, etc. The space idea also is utilized in building the multiplication tables, so that the products are also seen to be mensuration facts.

SUMMARIES.

At the end of the book are summaries of all parts to assist teachers (1) in testing the work of each year, (2) in assuring a definite outcome for each year, and (3) in knowing where and how to begin the work of the next year.

The pleasant task now remains to the author to make acknowledgment of his indebtedness to many superintendents, principals, and teachers who have assisted in perfecting the book by suggestions and corrections on the proof sheets. Their criticisms and suggested improvements have been incisive and valuable.

To Mr. F. W. Buchholz, Head of the Department of Mathematics in the Chicago Normal School, the author feels especially indebted for the great pains and efficient service bestowed upon both the manuscript and the proofs. His insight, patient scrutiny of detail, breadth of pedagogic view, and his large and varied experience as a teacher have qualified him to render wholesale improvement in both the form and the substance of this book. The author's sincerest thanks are but a feeble recompense for assistance so substantial as Mr. Buchholz has rendered.

THE AUTHOR.

Chicago, December, 1908

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PART I

By laying sticks, or splints, make figures like those in the pictures.

TENTS TENTS

1. How many sticks are needed for 1 tent?
2. How many sticks are needed for 2 tents?
3. How many twos of sticks are needed for 3 tents?
4. How many twos of sticks are needed for 4 tents?
5. How many sticks are needed for 3 tents? For 4 tents? For 5 tents?
6. How many are 2 twos? 3 twos? 4 twos? 5 twos?

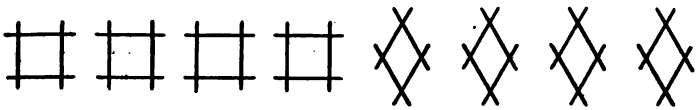
PENS

7. How many sticks are needed for 1 pen?
8. How many threes of sticks are needed for 2 pens? For 3 pens? For 4 pens?
9. How many sticks are needed for 2 pens? For 3 pens?
10. How many pens can be made from the sticks for 2 tents? How many sticks are left over?
11. How many pens will the sticks for 3 tents make?
12. How many threes can be made from 3 twos?
13. How many pens will the sticks for 6 tents make?
14. How many threes can be made from 6 twos?

1. How many tents have sticks enough for 1 frame?

2. How many sticks are needed for 1 frame?

3. How many twos are needed to make 4?



FRAMES KITES

4. How many frames can be made from the sticks for 2 pens? How many sticks are left over?

5. How many fours of sticks are needed for 2 frames? For 3 frames? For 4 frames?

6. How many sticks are needed for 2 frames? For 3 frames?

7. How many tents can be made from the sticks of 1 frame? Of 2 frames? Of 3 frames? Of 4 frames?

8. How many kites can be made from 2 tents? From 4 tents?

9. How many twos make 2 fours? 3 fours? 4 fours?

10. How many kites can be made from 1 frame? From 3 frames? From 4 frames?

GATES

11. How many more sticks are needed for a gate than for a pen? For a gate than for a tent?

12. 3 from 5 leaves how many? 2 from 5 leaves how many?

13. How many gates will a tent and a pen make?

14. How many are 2 and 3?

15. How many fives of sticks are needed for 2 gates?

A thermometer measures changes in heat. It is a glass tube with mercury in the lower part. When the air gets warmer the mercury swells and the top of it rises; when colder, the top of the mercury sinks.

1. Begin at 0° and name the number at each mark up to 30. Count by 2's to 30.

2. What numbers should stand beside the marks between 40 and 50? Between 50 and 60?

3. Count by 2's, without looking at the picture from 0 to 10. From 20 to 40.

4. Find from the picture how many 2's make 10.

5. How many 2's make 8? 6? 4? 12? 16?

6. Find from the picture how many 10's make 20; 30; 40; 50; 60.

7. Count by 10's from 0 to 60.

8. Show on the picture two 10's and a 2 more.

9. Show three 10's and two 2's more. Show how to write three 10's and two 2's. How do you speak it?

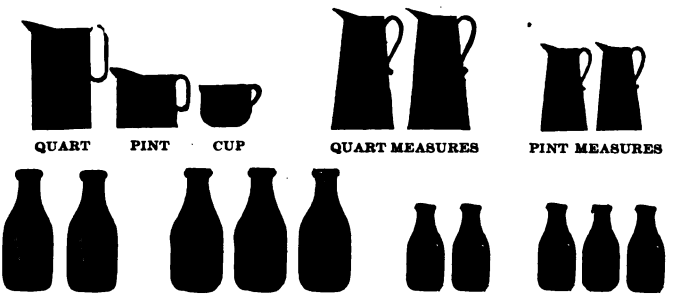
10. Point to the mark at 1 ten and 2 twos.

11. Point to the mark at 2 tens and 4 twos.

12. What mark is at the top of the mercury in the picture?

13. Point to the mark where the top of the mercury would be if it read 24. 18. 6. 44.

14. How many 10's and how many 1's in 14? In 23? In 28?



2 pints make 1 quart.

2 pt. = 1 qt.

1. How many pints of milk make one quart of milk?

2. How many pints make 2 quarts?

3. How many quarts of milk would 6 pints make? 8 pints? 10 pints?

4. 2 cups of milk make 1 pint of milk. How many cups of milk make 1 quart?

5. What part of a pint of milk is 1 cup of milk?

6. What part of a quart of milk is 1 cup of milk? 2 cups? 3 cups? 4 cups?

7. How much would a quart of milk cost at 1 cent a cup? At 2 cents a cup?

8. Milk costs 8 cents a quart. How much is this a pint? How much is this for 1 cup?

9. What is the cost of 1 pint of cream at 5 cents a cup? At 4 cents a cup? At 3 cents a cup?

10. How much would 1 quart of milk cost at 4 cents a pint? At 3 cents a pint? At 5 cents a pint?

11. Tell what numbers should stand in the blank places in these tables.

1 pt. makes 2 cups	1 qt. equals — pt.	2 twos are —
3 pt. make — cups	3 qt. equal — pt.	3 twos are —

2 pt. make — cups	2 qt. equal — pt.	4 twos are —
5 pt. make — cups	5 qt. equal — pt.	5 twos are —
6 pt. make — cups	6 qt. equal — pt.	6 twos are —
7 pt. make — cups	7 qt. equal — pt.	7 twos are —
8 pt. make — cups	8 qt. equal — pt.	8 twos are —
9 pt. make — cups	9 qt. equal — pt.	9 twos are —
10 pt. make — cups	10 qt. equal — pt.	10 twos are —

Write out the last table, using the sign, =, in place of the word *are*, and filling all the blanks.

EXERCISES IN ADDING, SUBTRACTING, AND MULTIPLYING

1. How many sticks are 2 sticks and 3 sticks? 2 sticks and 4 sticks?

2. How many are 2 and 1? 2 and 2? 3 and 1? 1 and 3?

3. If sticks enough are taken away from a frame to make a pen, how many sticks are left?

4. 3 sticks taken from 4 sticks leave how many sticks?

5. How many are 5 sticks less 3 sticks? 5 sticks less 2 sticks?

6. How many are 4 and 3? 7 less 3? 7 less 4?

7. How many are the first and second numbers together?

2	2	3	2	7	8	5	6	4	9
2	7	6	5	2	2	1	2	4	1

8. How many are 2 and 2? 5 + 1? 4 + 4?
2 and 3? 4 + 3? 6 + 6? 4 and 4? 2 + 3? 8 + 8?
3 and 5? 5 + 5? 7 + 7? 3 and 6? 3 + 3? 9 + 9?

The way of doing problems 7 and 8 is called *adding*.

9. The sign, +, here means *add the numbers:*

3	5	6	8	9	10
+4	+5	+2	+3	+1	+2

1. Take the lower number from the upper number:

5	5	6	6	6	7	8	8	8	9
4	5	5	4	2	3	3	5	7	6

2. How many are 6 less 4? 7 − 5? 9 − 4?
7 less 2? 8−3? 8−5? 9 less 6? 10−5? 10−4?
5 less 4? 9−7? 6−4? 8 less 5? 10−7? 10−3?

3. The sign, −, here means *take the lower number from the upper number.*

6	7	8	5	10	12	9	8
−4	−3	−5	−1	−2	− 7	−6	−4

4. Work these problems:

2	3	3	4	8	6	5	6	10	12
+2	+3	−1	+4	−4	−3	+5	+6	−5	−6

8	9	12	7	8	12	9	14	7
−2	− 6	−9	+6	+7	−7	−5	−7	+7

5. How much is 2 times the upper number in each of these?

3	2	4	5	6	9	7	8	10	11
2	2	2	2	2	2	2	2	2	2

The way of doing problem 5 is called *multiplying by* 2.

6. The sign × here means *multiply*.

7	2	4	4	1	8	5	3
×2	×3	×3	×2	×2	×2	×2	×2

7. Work these problems:

4	3	4	3	5	5	10	6	6	12
+4	+3	×2	×2	+5	×2	−5	+6	×2	−6

The sign for the word *are*, or *equals*, is =.

TABLE OF TWOS

2× 1= 2	What is one-half of 2?
2× 2= 4	What is one-half of 4?
2× 3= 6	What is one-half of 6?
2× 4= 8	What is one-half of 8?
2× 5=10	What is one-half of 10?
2× 6=12	What is one-half of 12?
2× 7=14	What is one-half of 14?
2× 8=16	What is one-half of 16?
2× 9=18	What is one-half of 18?
2×10=20	What is one-half of 20?
2×11=22	What is one-half of 22?
2×12=24	What is one-half of 24?

Multiply:

5	7	3	4	8	12	11	10	9
2	2	2	2	2	2	2	2	2

USES OF THREE

1. Draw a straight mark on the black-board 3 times as long as your foot-ruler. This mark is 1 yard long.

2. Spread your hands 1 yard apart, and show one yard.

3. Show the 1 foot spaces by marks across the yard measure.

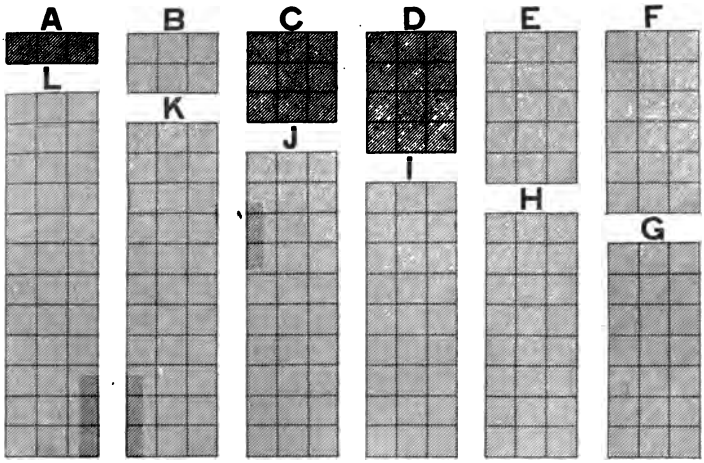
Three feet make one yard or 3 ft. = 1 yd.

4. How many feet are there in 2 yards? In 3 yards? In 5 yards? In 4 yards? In 6 yards?

5. How many yards long is a stick 6 feet long? 9 feet long? 15 feet long? 12 feet long? 18 feet long?

6. A piece of carpet is 1 yard wide and 2 yards long. How many feet is it around it?

7. At 3 cents a fare for children, what will the car-fare for 5 children be? For 6 children? For 7 children?



1. How many squares are there in A?

2. How many A's are there in B? In C? In D? E? F? G? H? I? J? K? L?

3. How many 3's are there in 6? In 9? In 12? In 15? In 18? In 21?

4. How many B's are there in D? How many 6's are there in 12?

5. How many B's are there in F? How many 6's are there in 18?

6. How many B's are there in H? How many 6's are there in 24?

7. How many C's are there in F? How many 9's are there in 18?

8. How many C's are there in I? How many 9's are there in 27?

9. A equals what part of B? Of C? Of D? Of E? Of F? Of G? Of H?

1. 3 equals what part of 6? Of 9? Of 12? Of 15? Of 18? Of 21? Of 24? Of 27? Of 30?

2. C equals what part of F? Of I? Of L?

3. 6 equals what part of 12? Of 18? Of 24?

4. How many squares are there in A? In B? C? D? E? F? G? H? I? J? K? L?

TABLE OF THREES

$1\times3=3$	What is one-third of 3?
$2\times3=6$	What is one-third of 6?
$3\times3=9$	What is one-third of 9?
$4\times3=12$	What is one-third of 12?
$5\times3=15$	What is one-third of 15?
$6\times3=18$	What is one-third of 18?
$7\times3=21$	What is one-third of 21?
$8\times3=24$	What is one-third of 24?
$9\times3=27$	What is one-third of 27?
$10\times3=30$	What is one-third of 30?
$11\times3=33$	What is one-third of 33?
$12\times3=36$	What is one-third of 36?

5. Multiply:

4	3	5	9	6	2	8	7	10	11	12
3	3	3	3	3	3	3	3	3	3	3

6. How many 3's are there in 6? In 12? 9? 15? 21? 18? 30? 27? 24? 36? 33?

7. How many is one-third of 9? Of 6? 12? 18? 15? 24? 33? 30? 36? 27?

8. Count by 3's from 0 to 36.

9. A man steps 1 yard at each step. How many feet does he go in 10 steps? In 12 steps? In 11 steps? In 9 steps? In 7 steps? In 8 steps?

1. In a family there are a father, a mother, and three children. How many persons are in the family?

2. Margaret has 2 sisters and 3 brothers. How many children are in her family?

3. A girl pays 3 cents car-fare going to school, and 3 cents coming home. How much is her fare each day if she goes to school and comes home twice a day?

4. A boy paid 3 cents for a pencil and 5 cents for a tablet. How much did he pay for both?

5. What will 12 two-cent postage stamps cost?

6. How many tops at 4 cents apiece can be bought with 20 cents?

7. A boy pays 10 cents for a ball, 12 cents for a bat, and 3 cents for candy. How much does he spend for all?

8. A boy steps 24 feet in 12 equal steps. How long is each step?

9. Martha bought three yards of ribbon for 36 cents. How much a yard did she pay?

10. In a game of London Bridge there were 8 on one side and 7 on the other. How many were in the game?

11. In a game of Blackman, there were 16 on one side and 9 on the other. How many more were on the larger side?

12. How many 5-cent stamps can be bought for 15 cents?

13. How many newspapers at 2 cents a paper can be bought for 22 cents?

14. William had 18 marbles and lost half of them. How many had he left?

15. Charles had 24 pigeons; one-third of them flew away and did not come back. How many had he left?

EXERCISES FOR REVIEW AND PRACTICE

1. Add:

6	6	3	2	2	2	4	4	6	7	8	8
5	1	5	9	8	4	6	8	6	7	4	3
9	9	5	5	10	12	9	9	7	8	8	8
7	9	7	8	7	5	3	5	6	7	8	9

2. Take the lower number away from the upper number, or subtract.

9	9	7	7	8	8	8	6	6	5	4	5	9
3	2	3	5	4	2	6	5	2	5	3	2	8
11	10	24	11	15	18	20	18	9	19	17		
7	4	8	4	7	9	9	5	4	7	8		

3. Multiply:

9	6	8	5	7	4	3	8	2	10	11	11	10	12	9
2	2	2	2	2	3	3	3	3	2	2	3	3	2	3

4. + means *add*, − means *subtract*, and × means *multiply*. Do whatever the sign before the lower number shows:

2	4	3	5	2	4	3	5	4	6	5
+2	×3	+6	+6	+3	×2	×3	×2	+5	+6	+9
7	4	6	5	7	6	8	7	9	6	9
+8	×3	×2	−4	−4	+2	×3	×2	+6	×3	×3

5. Add:

1	5	6	7	6	5	9	7	5	7	6	3	8	9	8	7
2	2	2	2	4	3	2	3	3	4	3	8	5	4	2	4
3	3	1	3	2	2	1	5	4	2	2	2	3	3	4	5

APPLICATIONS OF THE TWOS AND THE THREES

1. Using 3 quarts of milk a day, how long will it take a family to use 27 quarts?

2. How many dresses at 2 dollars apiece can be bought for 10 dollars?

3. Joseph is 14 years old and Agnes is 3. How much older is Joseph than Agnes?

4. Cecil puts 3 cents a day in his savings bank. How much does he put in his bank in 12 days?

5. Helen spends 15 cents for lunch, and 6 cents for car-fare every day. How much does she spend each day for both? How much does she spend in 2 days?

6. A boy buys 10 two-cent stamps and 8 note books at 3 cents each. How much do all cost?

7. A man pays a debt of 18 dollars by working at 3 dollars a day. How long does it take him to pay it?

8. Add, and note the time it takes:

6	7	8	9	7	5	6	6
4	2	2	2	4	5	5	3
3	3	2	4	2	3	2	5
1	4	3	1	3	3	2	5

9. Subtract, and note time it takes:

10	11	12	27	28	19	17	11
3	8	9	7	10	8	6	7

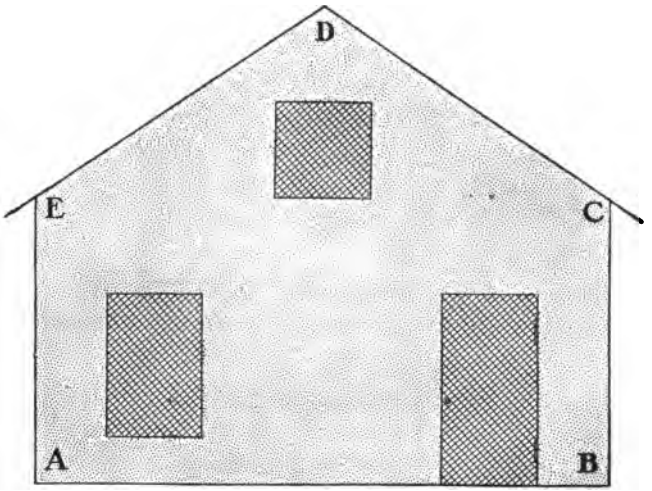
10. Multiply each of these numbers by 2 as rapidly as you can do it correctly and write the result:

3 2 5 6 4 7 9 8 12 10 11

11. Multiply each of these numbers by 3 as rapidly as you can do it correctly and write the results:

2 4 3 10 5 6 8 7 9 12 11

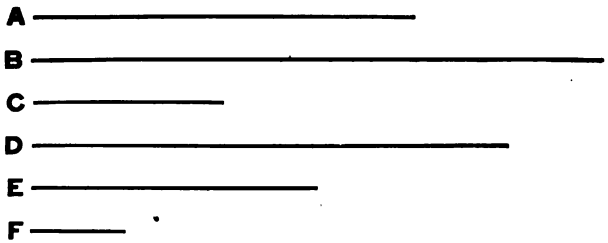
PART II



A boy made a cardboard house. One end of it was the size of this drawing.

Without measuring, write on a separate sheet what you think are the distances named below:

1. The width of the house. The greatest height.
2. The length of the slant of the roof.
3. The height of the side of the house.
4. Height of the door. Width of the door.
5. Distance between door and lower window.
6. Width of the lower window.
7. Length and width of the upper window.
8. Distance from floor to top of lower window.
9. Distance from floor to bottom of lower window.
10. Length of lower window.
11. Measure the same distances with a ruler and see how near they are to what you thought they were.



1. The line A and the line C equal which line?

2. The line A is how many times as long as the line C?

3. The line B is how many times as long as the line C?

4. The line E and the line F equal which line?

5. If from the line B we take a line equal to the line C, which line will the remainder equal?

6. Two times the line C equals which line?

7. Three times the line C equals which line?

8. Two times the line F equals which line?

9. The line E is three times which line?

10. Two times the line E equals which line?

11. What is the length of the line C? Of the line A? Of the line E? The line F? The line D?

Read the problems, filling the blanks:

12. 2 inches and 1 inch are ..... inches.

13. 3 inches and 1 inch are ..... inches.

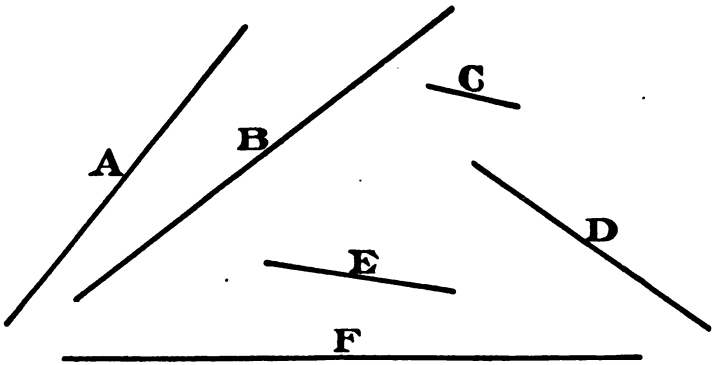
14. 3 inches equal 2 inches and ..... inch.

15. 3 inches equal 1 inch and ..... inches.

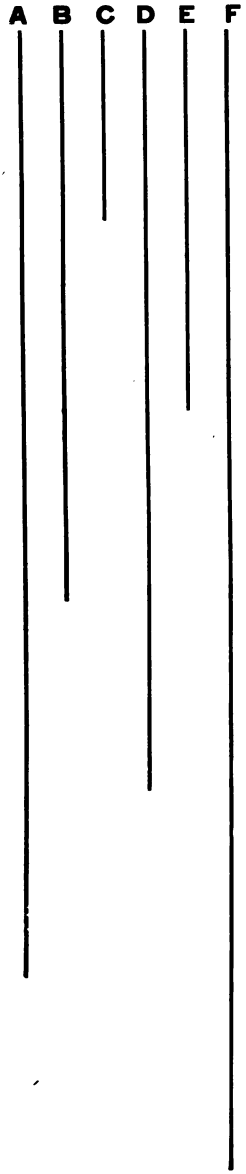
16. 3 inches less 1 inch are ..... inches.

17. 1 and one-half inches and 1 inch are ..... inches.

18. 3 inches less 1 and one-half inches are ..... inches.



1. Which line is longest? Next longest?
2. Which line is shortest? Next shortest?
3. The line E is longer than which line?
4. The line D is shorter than which line?
5. The line C and the line E equal which line?
6. The line C and the line D equal which line?
7. Which two lines together equal the line F?
8. Which line equals the difference of the line F and the line C?
9. How long is the line E? The line C? The line D? The line A? The line B? The line F?
10. Which two lines together equal the line D?
11. What part of the line E equals the line C?
12. How many half inches make one inch?
13. The line A equals how many times the line E?
14. How many inches is one-half of two inches?
15. The line D is how many times as long as the line C?
16. How many half-inches are there in one and one-half inches?
17. The line A equals how many times the line C?
18. How many half-inches make 2 inches?



1. The line A is how many times as long as the line C?

3. The line A and the line C equal which line?

3. The line D is how many times as long as the line C?

4. The line E is how many times as long as the line C?

5. The line E and the line D equal which line?

6. The line B is how many times as long as the line C?

7. The line B and the line E and the line C equal which line?

8. The line C and which line equal the line F?

9. The line E and which line equal the line F?

10. The line B and which lines equal the line F?

11. The line D and which line equal the line F?

12. If from the line F we take a line equal to the line C, which line will the remainder equal?

13. If from the line F we take a line equal to the line E, which line will the remainder equal?

14. If from the line F we take a line equal to the lines B and C, which line will the remainder equal?

1. If from the line F we take a line equal to the line B, which lines will the remainder equal?

2. If from the line F we take a line equal to the line D, which line will the remainder equal?

3. If from the line F we take a line equal to the line A, which line will the remainder equal?

4. Three times the line C equals which line?

5. Six times the line C equals which line?

6. Two times the line B equals which line?

7. The line F is two times as long as which line?

8. The line B is one-half as long as which line?

9. Two times the line C equals which line?

10. The line F is three times as long as which line?

11. The line E is one-third as long as which line?

12. The line F is how many times as long as the line C?

13. The line C equals what part of the line F?

14. The line F is how many times as long as the line E?

15. The line E equals what part of the line F?

16. The line D equals what part of the line F?.

17. The line F is how many times as long as the line B?

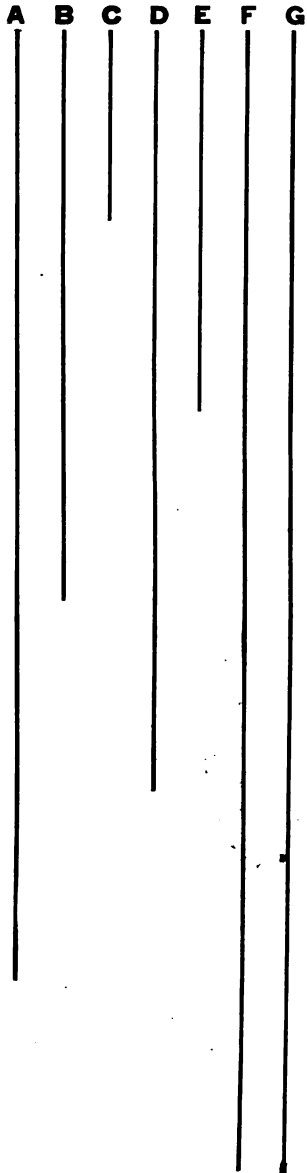
18. The line B equals what part of the line F?

19. 2 and 2 are .....? 3 and 1 are .....? 4 and 1 are .....? $2+3=?$ $3+1=?$ $3+3=?$ $4+2=?$

20. 4 less 2 are .....? 4 less 1 are .....? 5 less 2 are .....? $5-1=?$ $6-3=?$ $5-2=?$ $6-4=?$

21. Two 2's are .....? Two 3's are .....? Three 2's are .....? Three 1's are .....? Four 1's are .....? Five 1's are .....?

22. One-half of 2 is .....? One-half of 6 is .....? One-third of 6 is .....? One-half of 4 is .....? One-fourth of 4 is .....? One-fifth of 5 is .....?



1. How many inches long are the two lines F and G together?

2. How many inches are there in a foot?

3. How many times the line G equals a foot? The line G equals what part of a foot?

4. How many inches are there in one-half of a foot?

5. The line G, the line A, and which other line together make a foot?

6. The line B, the line D, and which other line together make a foot?

7. The line B, the line F, the line E, and which other line together make a foot?

8. How many times the line B equals a foot? The line B equals what part of a foot?

9. How many inches are there in one-fourth of a foot?

10. How many times the line D equals a foot? The line D equals what part of a foot?

11. How many inches are there in one-third of a foot?

12. Which three lines together equal one foot?

1. How many times the line E equals a foot? The line E equals what part of a foot?

2. How many inches are there in one-sixth of a foot?

3. How many times the line B equals one-half a foot?

4. How many times E equals one-half of a foot?

5. How many times the line F equals one-half of a foot?

6. Which line equals one-third of a foot?

7. How many times the line E equals one-third of a foot?

8. Which line equals one-fourth of a foot?

9. How many times the line C equals one-fourth of a foot?

10. Which line equals one-sixth of a foot?

11. How many times E equals one-sixth of a foot?

12. What two lines together make one-half of a foot? Two-halves of a foot? One-fourth of a foot? One-third of a foot?

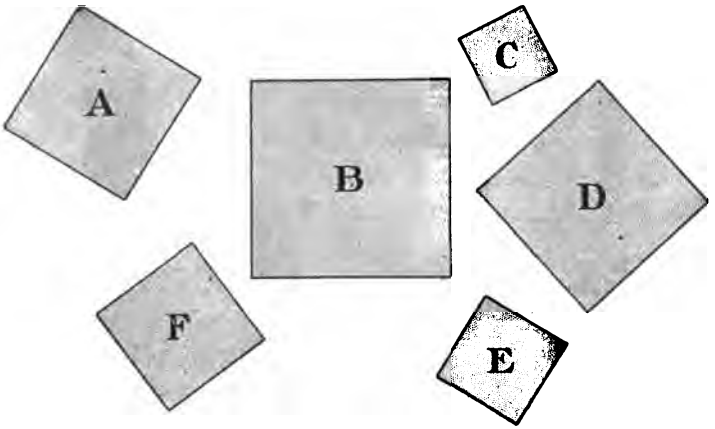
13. Add these numbers:

1	2	1	2	1	2	1	2	3	1	2	4
1	1	3	2	4	3	5	4	3	6	5	3

1	2	3	4	1	2	3	4	1	2	3
7	6	5	4	8	7	6	5	9	8	7

4	5	2	3	4	5	3	4	5	6
6	5	9	8	7	6	9	8	7	6

4	5	6	5	6	7	6	7	7	8	8	9
9	8	7	9	8	7	9	8	9	8	9	9



1. Which square is the largest?

2. Which square is the smallest?

3. The square B is larger than which squares?

4. The square D is smaller than which squares.

5. The square D is larger than which squares?

6. The square A is larger than which squares?

7. The square A is smaller than which squares?

8. The square E is smaller than which squares?

9. The square E is larger than which square?

10. The square C is smaller than which squares?

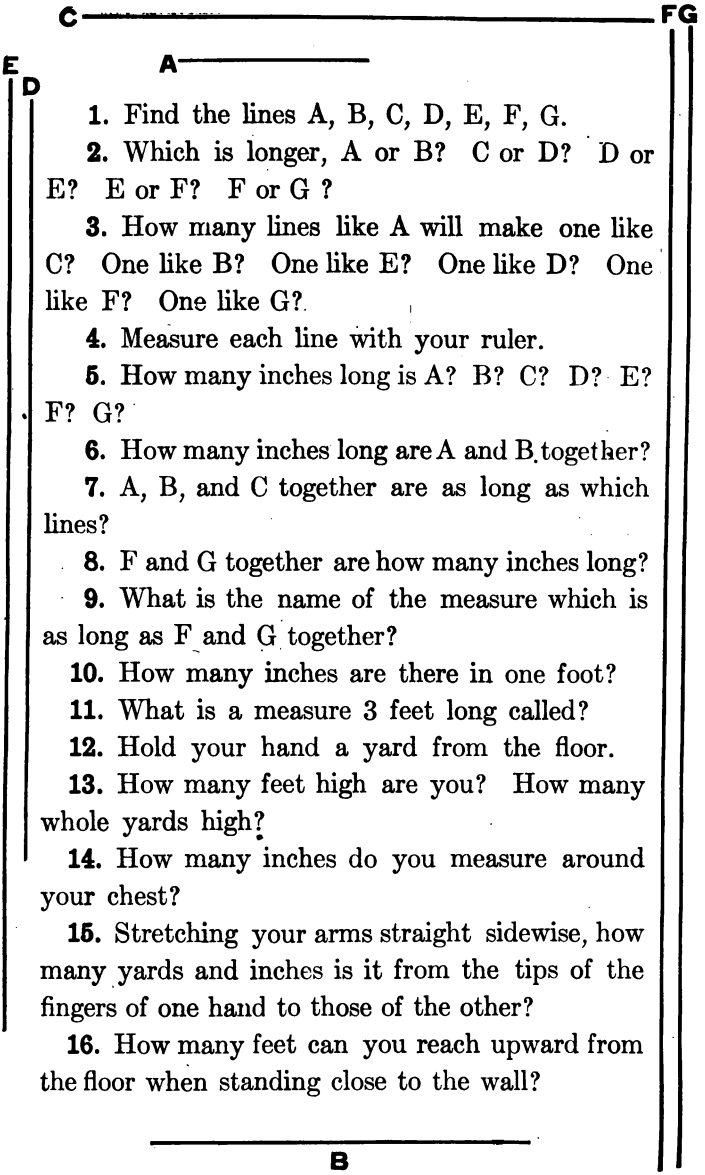
11. The square F is larger than which squares?

12. Which squares are larger than the square F? Which are smaller?

13. Which squares are smaller than the square A? Which are larger?

14. Which squares are larger than the square C?

15. Which squares are larger than the square E? Which are smaller?



1. Find the lines A, B, C, D, E, F, G.

2. Which is longer, A or B? C or D? D or E? E or F? F or G ?

3. How many lines like A will make one like C? One like B? One like E? One like D? One like F? One like G?

4. Measure each line with your ruler.

5. How many inches long is A? B? C? D? E? F? G?

6. How many inches long are A and B together?

7. A, B, and C together are as long as which lines?

8. F and G together are how many inches long?

9. What is the name of the measure which is as long as F and G together?

10. How many inches are there in one foot?

11. What is a measure 3 feet long called?

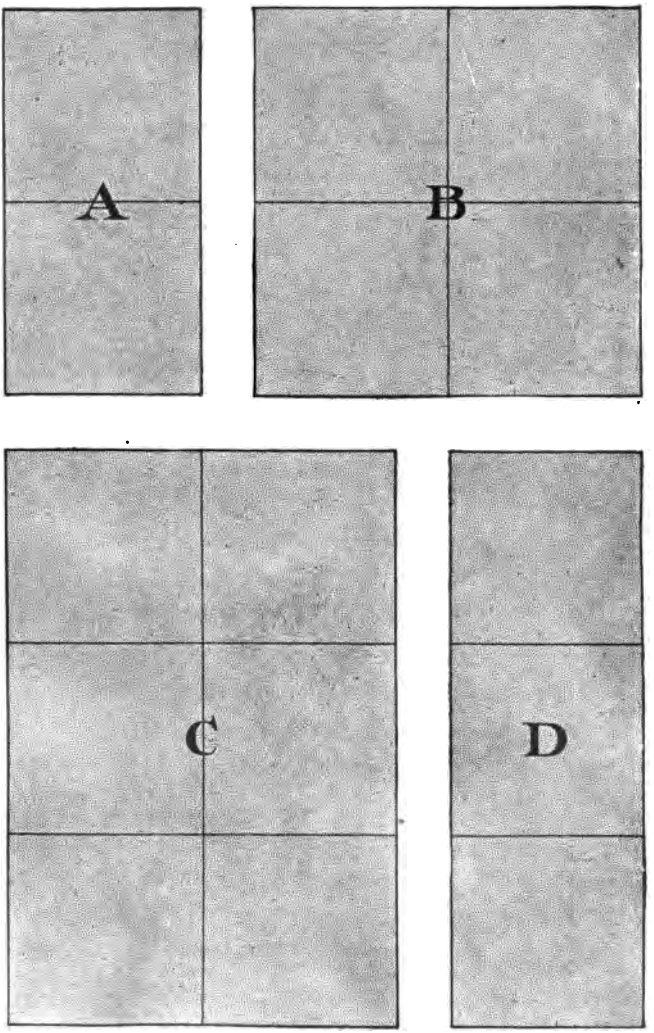
12. Hold your hand a yard from the floor.

13. How many feet high are you? How many whole yards high?

14. How many inches do you measure around your chest?

15. Stretching your arms straight sidewise, how many yards and inches is it from the tips of the fingers of one hand to those of the other?

16. How many feet can you reach upward from the floor when standing close to the wall?



1. How long is the oblong A? How wide?
2. What is the size of one-half the oblong A?
3. How many square inches are there in it?

1. 1 square inch is what part of the oblong A?

2. How long are the sides of the square B?

3. How many rows of square inches are there in the square B?

4. How many square inches are there in the upper row of the square B? How many square inches are there in the whole square?

5. One row is what part of the square?

6. 1 square inch is what part of one row?

7. 1 square inch is what part of the square? 2 square inches are what part?

8. How long and how wide is the oblong D, or what are the dimensions of the oblong D?

9. How many square inches are there in the oblong D?

10. 1 square inch is what part of the oblong? 2 square inches are what part?

11. What are the dimensions of, or how long and how wide is the oblong C?

12. How many rows of 3 square inches are there in the oblong C?

13. How many square inches are there in the oblong C?

14. 1 square inch is what part of the whole oblong C? 2 square inches are what part?

15. How many rows of 2 square inches are there in the oblong C?

16. One row is what part of the oblong C?

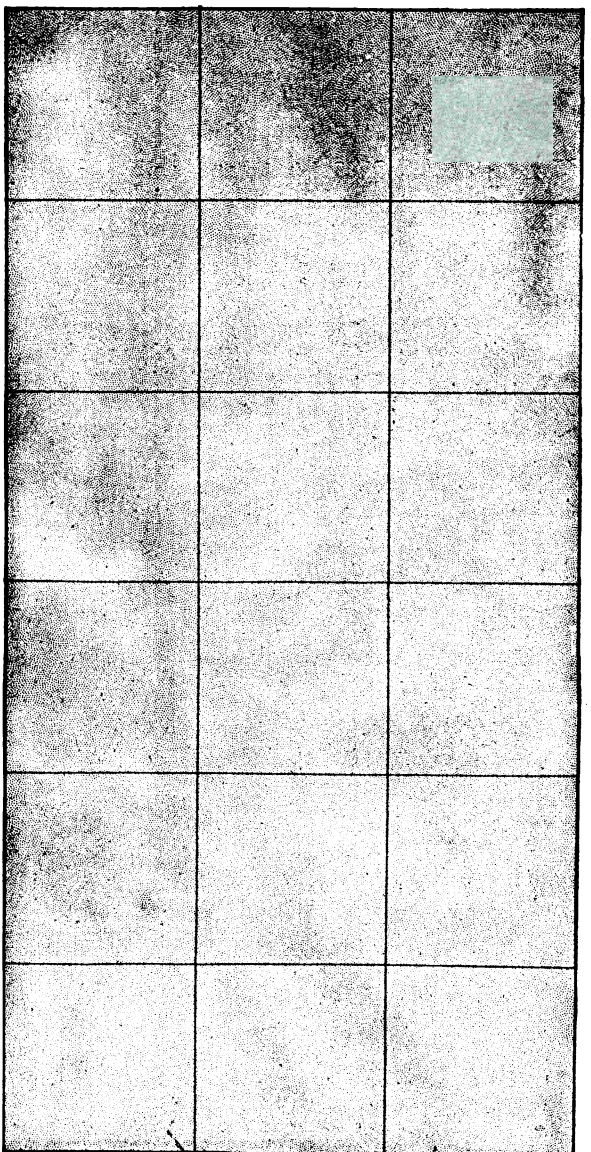
17. One-third equals how many sixths?

18. The oblong D equals what part of the oblong C?

19. One-half equals how many sixths?

20. The oblong A equals what part of the oblong C?

21. The oblong B is what part of the oblong C?



1. What are the dimensions of the oblong page 36?

2. How many square inches are there in it?

3. How many rows of 6 square inches are there in the oblong?

4. What part of the oblong is one of these rows? What part is two rows?

5. How many rows of 3 square inches are there in the oblong?

6. What part of the oblong is one row? What part is 2 rows? 3 rows? 4 rows? 5 rows?

7. What part of the oblong is 1 square inch? What part is 2 square inches? 3 square inches? 9 square inches?

8. How many three-inch squares can be cut from the oblong?

9. How many two-inch squares can be cut from the oblong?

10. How many oblongs 2 inches long and 1 inch wide can be made from the oblong?

11. What number belongs in each of these blanks?

9 and 9 are	18 less 9 are .....
6 and 12 are	18 less 6 are .....
3 and 15 are	18 less 3 are .....
10 and 8 are	18 less 12 are .....

12. In 18 there are how many 6's? How many 2's in 18? What part of 18 is 6?

13. In 18 there are how many 9's? How many 3's in 18? What part of 18 is 9? What part of 18 is 3?

14. How many 3's in 6? How many 3's in 12?
How many 3's in 3? How many 3's in 15?
How many 3's in 9? How many 3's in 18?

1. Measure and find how many feet wide the cloak room of your schoolroom is. How many feet long?

2. A yard stick is 3 feet long. How many yards long is the cloak room of your schoolroom?

3. If a strip of carpet were laid from the door to the teacher's desk, how many feet long would it be? How many yards long?

4. How long, in feet and inches, would a flower box have to be to cover the longest window sill in your schoolroom?

5. How many whole feet is the lower edge of the blackboard, in your schoolroom, above the floor? How many feet and inches? How many inches?

6. How many feet is the lowest hat hook, in the cloak room, from the floor? How many feet and inches? How many inches?

7. Place a mark on the blackboard as high as the top of your head is from the floor. How tall are you, in feet and inches? In inches?

8. Place a mark on the blackboard as high as you can reach. How many feet and inches is it from the floor? How many inches?

9. With a piece of chalk in each hand, make two marks upon the blackboard at the same time, as far apart as you can reach. Tell, without measuring, how far you think the marks are apart. Measure, and tell the difference between your first answer and the correct one.

10. Copy on a separate sheet, filling the blanks:

TABLE

..... inches make 1 foot.
..... feet make 1 yard.
..... inches make 1 yard.

1. How many inches long is the front edge of your desk?

2. How many inches high is your desk?

3. How many feet high is a window sill in your schoolroom?

4. How many feet wide is the window?

5. Your schoolroom is how many feet long? How many yards long?

6. Your schoolroom is how many feet wide? How many yards wide?

7. How long, in feet, is one end of your schoolroom? How long are the two ends? How long is one side? How long are the two sides? How long are the two sides and ends together?

8. Step off what you think is $5\frac{1}{2}$ yards, on a straight line. Measure, and find how much greater or less it is than $5\frac{1}{2}$ yards.

9. How many feet in 36 inches? In 24 inches?

10. A blackboard 6 feet long is how many yards long?

11. A box that is 2 yards long is how many feet long?

12. A room 12 feet wide is how many yards wide?

13. How many yards are there around a table 2 yards long and 1 yard wide?

14. 3 and 2 are 5.
2 added to 3 equals 5
3 plus 2 equals 5
3+2=5

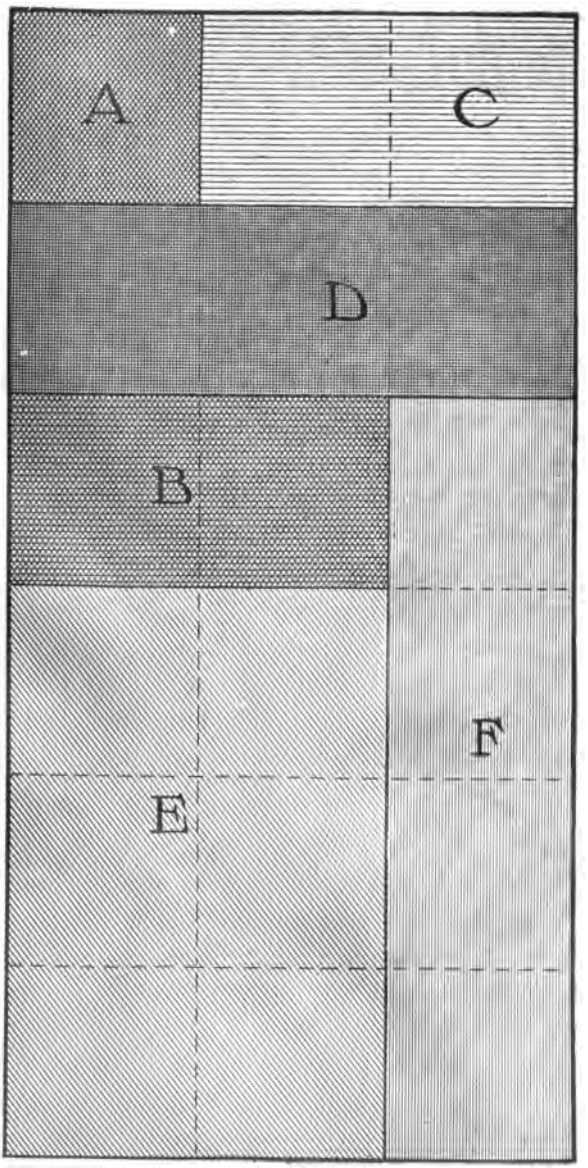
All these have the same meaning. Which is the shortest to write?

15.

3+4=?	6+2=?	4+2=?	6+7=?
8+4=?	3+5=?	5+4=?	7+2=?

16. Add:

6 pounds	8 dollars	6 feet	9 yards	7 inches
5 pounds	2 dollars	3 feet	6 yards	5 inches


A
C
D
B
F
E

1. Find a surface (space) on page 40 which is equal to A.

2. On page 40, find a surface equal to two times A. What is it marked? How long is it? How wide? What kind of a figure is it?

3. How many square inches are there in B, or, what is the area of B? Draw an oblong the same size as B.

4. Draw an oblong as long as A and B (page 40).

5. How long is the oblong (rectangle) you have drawn? How wide? What is its area?

6. Find on page 40 a rectangle (oblong) the same size as the one you have just drawn.

7. On page 40, A and D together form a rectangle how long? How wide? What is its area?

8. Make a square equal to A and D together. What kind of a square is it called?

9. What is the area of the square just made, or how many square inches are there in it?

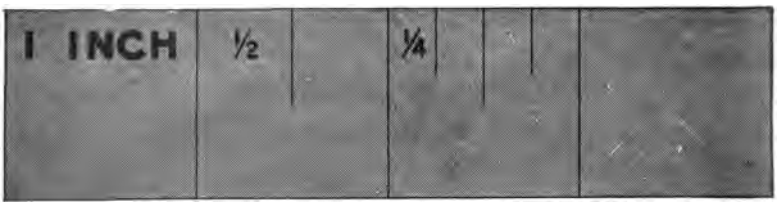
10. 2 twos equal 4.
2 multiplied by 2=4
2 times 2=4
2×2=4

} All these have the same meaning. Which is the shortest to write?

11.

2×3=?	3×3=?	4× 5=?	2×11=?
3×4=?	4×4=?	3× 6=?	3×10=?
2×6=?	3×5=?	4× 6=?	2×12=?
5×2=?	2×4=?	2×10=?	3×12=?

12. Two 3's equal how many 2's?
Two 4's equal how many 2's?
Three 4's equal how many 3's?
Two 5's equal how many 2's?
Three 5's equal how many 3's?
Four 5's equal how many 4's?



1. How many inches are there in a foot?

2. Using the drawing on this page for a measure, cut a piece of stiff paper the same width and three times as long, for a rule.

3. Divide your rule into half inches. How many half inches will you have on your rule?

4. Divide it into quarter inches. How many quarter inches are there? Count them.

5. Draw a rectangle that is 5 inches long and that contains 10 square inches. How wide is it?

6. Draw a rectangle that is 3 inches long and contains 9 square inches. How wide is it?

7. Multiply:

2	5	3	6	8	4	12	11	10
2	2	2	2	2	2	2	2	2
2	5	3	6	8	4	12	11	10
3	3	3	3	3	3	3	3	3

8. How many 2's in 4? In 8? In 6? In 10? In 12?

9. How many 3's in 6? In 12? In 3? In 9? In 15?

10. What is one-half of 4? Of 8? Of 10? Of 12? Of 16?

11. What is one-third of 6? Of 12? Of 9? Of 15? Of 18?

12. Count by 2's to 50; by 3's to 48.

13. Two is one-half of what number? Two is one-fourth of what number? One-third of what number?

1. On p. 33 which is the shortest line? The next in length? What is the difference between them?

2. C is how much longer than B? F than C?

3. F and G together are how much longer than D?

4. Draw a line twice as long as E. Name it H. Mark off a part of H equal to C on p. 33. What is the length of the rest of H?

5. Draw a line 12 inches long. Mark off 3 inches. How many inches remain?

6. Draw a line 14 inches long. Mark off 6 inches. How much remains?

7. Find F on page 40. If a square equal to A is taken away, how many square inches remain?

8. In square inches what is the difference between B and F? E and F? D and E?

9. How much larger is the whole rectangle than E?

10. A 3-inch square contains how many more square inches than a 2-inch square?

11. A rectangle containing 12 square inches is how much larger than one containing 5 square inches?

12. 6 less 2 = 4
2 subtracted from 6 = 4
6 minus 2 = 4
6 − 2 = 4

All these have the same meaning. Which is the shortest way to write this statement?

13.

8 − 4 = ?	10 − 3 = ?	8 − 5 = ?	9 − 5 = ?
11 − 5 = ?	12 − 7 = ?	9 − 7 = ?	8 − 6 = ?
10 − 7 = ?	11 − 6 = ?	12 − 5 = ?	7 − 3 = ?

14. Subtract:

6	7	8	9	10	11	12	8	9
3	5	6	4	4	7	7	3	6

1 Quart 1 Gallon 1 Gill 1 Pint

1. Name things that are measured by the liquid quart?

2. By measuring, find how many pints in a quart.

3. Two quarts equal how many pints?

4. One pint equals what part of a quart?

5. Measure and find how many gills in a pint.

6. Four pints equal how many quarts?

7. Name things that are measured by the gallon?

8. Measure and find how many quarts in a gallon. How many pints are there in a gallon?

9. What part of a gallon is one quart? What part of a gallon is 2 quarts? What part is 3 quarts?

10. Copy on a separate sheet, filling the blanks:

	Quarts.	Pints.	Gills.
1 gallon =	.....	.....	.....
1 quart =		.....	.....
1 pint =			.....

Answer all you can orally

1. At 12 cents a quart, what will a pint of oil cost?

2. What will a gallon of milk cost at 6 cents a quart?

3. How many gallons will a twelve-quart can hold?

4. How many quarts will a three-gallon jug hold?

5. How many quarts of milk are there in sixteen pints? In twenty pints? In twenty-four pints?

6. A boy bought two gallons of mineral water, and sold four pints of it. How many pints had he left? How many quarts? How many gallons?

7. At 24 cents a gallon, what will a quart of molasses cost? What will 3 quarts cost? 5 quarts?

8. At 24 cents a gallon, what will 1 pint of molasses cost? What will 3 pints cost? 6 pints?

9. Allen and Harold kept a lemonade stand at a picnic. At 20 cents a gallon, what did it cost them to make 2 gallons of lemonade?

10. They sold 8 pint-glasses at 5 cents a glass. How much did they receive for them? How many quarts did they sell in this way?

11. They sold 6 pints at 8 cents a quart. How much did they receive for them? How much had they now sold altogether?

12. They sold the remainder at 4 cents a pint-glass. How much did they receive for it?

13. How much did they receive for the three sales together? How much did they gain?

14. Add:

3 gills	4	3 quarts	4	5 gallons	7
2 gills	1	2 quarts	5	4 gallons	3
2 gills	5	5 quarts	6	3 gallons	6

Half-Bushel Bushel Quart Half-Peck Peck

1. Name things that are sold by the bushel?

2. Find by measuring how many pecks equal 1 bushel.

3. One peck equals what part of a bushel?

4. One-half of a bushel equals how many pecks? One-fourth of a bushel equals how many pecks? Three-fourths of a bushel equal how many pecks?

5. How many pecks equal one and one-half bushels?

6. Find by measuring how many quarts equal 1 peck.

7. Put four quarts of saw-dust into the peck measure. Tell what part of the measure is filled.

8. Two quarts equal what part of a peck?

9. How many quarts equal one and one-half pecks?

10. How many quarts fill a bushel measure?

11. One-eighth of a bushel is how many quarts?

12. One-fourth of a bushel is how many quarts?

13. Three-fourths of a bushel equals how many quarts?

14. Copy on a separate sheet, filling the blanks:

	Pecks.	Quarts.	Pints.
1 bushel =	.....	.....	.....
1 peck =		.....	.....
1 quart =			.....

1. At 4 cents a quart, what will 9 quarts of beans cost?

2. A bushel contains how many pecks?

3. There are 2 pecks of shelled corn in a bin and 8 quarts are taken out. How many quarts are left in the bin? How many pecks?

4. A man put a peck of oats in an empty bin at one time and a half-bushel at another. How many pecks were there then in the bin? How many quarts?

5. What will 4 quarts of berries cost, at 8 cents a quart?

6. If cherries cost 10 cents a quart, what will a half-peck cost?

7. A boy picked one and one-half bushels of cherries. He sold them all by the peck. How many pecks did he sell? How many dollars did he receive for them at one-half dollar a peck?

8. How many bags holding one bushel each would be needed to hold twenty-four pecks of corn? How many holding two bushels each would be needed?

9. At 6 cents a quart, what will a peck of onions cost? What will three-fourths of a peck cost?

10. From 2 bushels of wheat in a bin 7 pecks are taken. How many pecks are left? How many quarts?

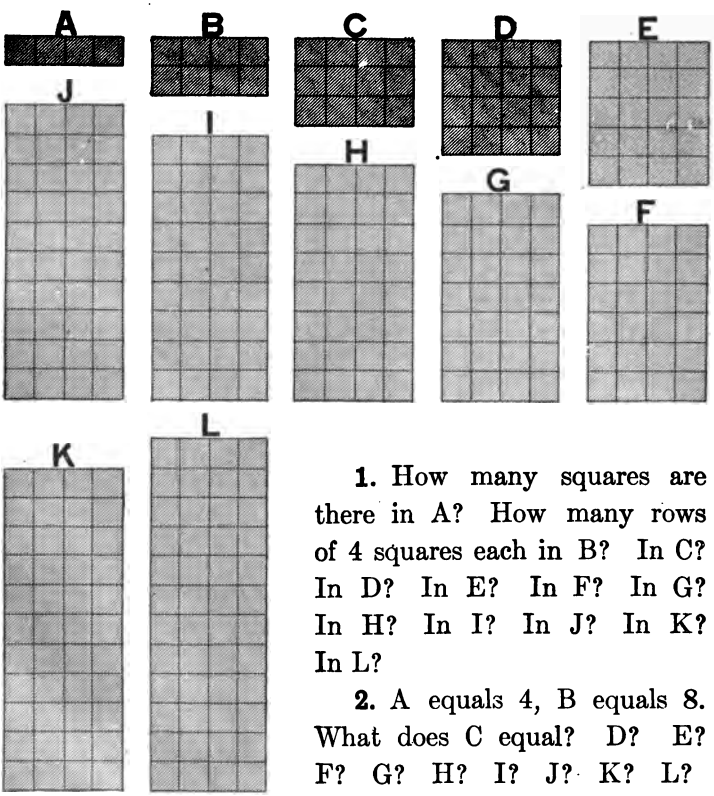
11. A man can dig 5 bushels of potatoes in one hour. How many bushels can he dig in 4 hours?

12. At 30 cents a bushel, what will 2 pecks of oats cost?

13. A can holds 16 quarts of berries. 10 pints of berries are taken out. How many pints are left?

14. At 1 dollar a bushel, what will 1 peck of apples cost?

15. If apples are bought at a dollar a bushel and sold at 30 cents a peck, what is the gain on 1 peck? On 1 bushel? On 4 bushels?



1. How many squares are there in A? How many rows of 4 squares each in B? In C? In D? In E? In F? In G? In H? In I? In J? In K? In L?

2. A equals 4, B equals 8. What does C equal? D? E? F? G? H? I? J? K? L?

3. A equals what part of B? What part of C? Of D? Of E?

4. 4 is what part of 8? What part of 12? Of 16? Of 20? Of 24? Of 28? Of 32? Of 36? Of 40? Of 44? Of 48?

5. B equals how many A's? B equals what part of D? Of F? Of H? Of J?

6. 8 equals how many 4's? 8 equals what part of 16? Of 24? Of 32? Of 40? Of 48?

7. Two fours equal how many twos. Use B.

1. 4 fours equal how many eights. See D. 6 fours equal how many sixes. See F.

2. 8 fours equal how many eights? See H. 10 fours equal how many tens? See J.

3. C equals how many A's? C equals what part of F? Of I? Of L?

4. 12 equals how many 4's? 12 equals what part of 24? Of 36? Of 48?

5. D equals how many A's? How many B's? D equals what part of H? Of L?

6. 16 equals how many 4's? How many 8's? 16 equals what part of 32? Of 48?

7. E equals how many A's? What part of J?

8. 20 equals how many 4's? What part of 40?

9. F equals how many A's? B's? C's? What part of L?

10. 24 equals how many 4's? 8's? 12's? What part of 48?

11. G equals how many A's? 28 equals how many 4's?

12. H equals how many A's? How many B's? D's?

13. 32 equals how many 4's? How many 8's? 16's?

TABLE OF FOURS

$4\times1=4$	$4\times4=16$	$4\times7=28$	$4\times10=40$
$4\times2=8$	$4\times5=20$	$4\times8=32$	$4\times11=44$
$4\times3=12$	$4\times6=24$	$4\times9=36$	$4\times12=48$

14. Multiply:

7	10	9	8	2	4	3	5	6
4	4	4	4	4	4	4	4	4

15. 8 contains 4 two times
8 divided by 4 = 2
$\frac{1}{4}$ of 8, or 8 ÷ 4 = 2

These all have the same meaning? Which is the shortest to write?

16. $12\div4=?$ $32\div4=?$ $28\div4=?$ $24\div4=?$

1. Name some things that are sold by the pound?

2. One pound equals how many ounces?

3. How many ounces in half a pound? In a fourth of a pound? In three-fourths of a pound?

4. The four-ounce weight equals what part of the pound?

5. The eight-ounce weight and the four-ounce weight together equal what part of the pound?

6. One and one-half pounds equal how many ounces?

7. Hold different objects in your hand and tell what you think the weight of each is. Weigh each and compare its weight with what you thought it to be.

8. Copy on a separate sheet, filling the blanks:

1 pound = ... ounces.

$\frac{1}{2}$ pound = ... ounces.

$\frac{1}{4}$ pound = ... ounces.

William and Mary went with a camping party and kept a small grocery store.

They bought for it the following articles:

4 pounds of sugar at 5 cents a pound.
12 pounds of white flour at 4 cents a pound.
10 pounds of Graham flour at 3 cents a pound.
1 pound of tea at 60 cents a pound.
4 pounds of crackers at 9 cents a pound.
1 pound of cinnamon at 40 cents a pound.
1 pound of black pepper at 32 cents a pound.
12 bars of soap at 4 cents a bar.

1. How much did it cost them to buy all the sugar? White flour? Graham flour? Crackers? Soap?

2. They sold the sugar in half-pound packages at 3 cents a package. How much did they receive for all the sugar? Find the gain on all the sugar?

3. They sold the white flour in bags of 4 pounds each, at 5 cents a pound. How many bags of flour did they sell? How much did they receive for it? How much did they gain on it?

4. They sold the Graham flour at 4 cents a pound. How much did they receive for it? Find the gain on it?

5. They sold the tea in quarter-pound packages at 20 cents a package. How much did they receive for it? How much did they gain on it?

6. The cinnamon was sold in 4-ounce packages, at 12 cents a package. How much was that for each ounce? How many packages were there? How much money was received for all the cinnamon? What was the gain on one pound?

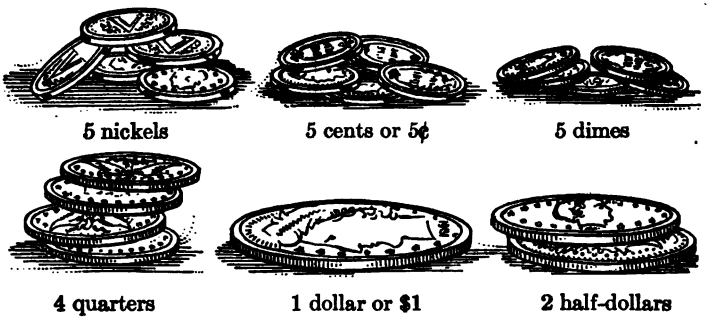
7. The pepper was sold at 2 cents an ounce. Did they lose or gain on it, and how much?

EXERCISES ON TWOS AND THREES

Read the lines across the page, giving answers. Then read and answer the questions from the top downward.

2×4, or $4\times 2=?$	$\frac{1}{2}$ of 8, or $8\div 2=?$	$\frac{1}{4}$ of 8, or $8\div 4=?$
2×3, or $3\times 2=?$	$\frac{1}{2}$ of 6, or $6\div 2=?$	$\frac{1}{3}$ of 6, or $6\div 3=?$
$2\times 2=?$	$\frac{1}{2}$ of 4, or $4\div 2=?$	.....
2×5, or $5\times 2=?$	$\frac{1}{2}$ of 10, or $10\div 2=?$	$\frac{1}{5}$ of 10, or $10\div 5=?$
2×8, or $8\times 2=?$	$\frac{1}{2}$ of 16, or $16\div 2=?$	$\frac{1}{8}$ of 16, or $16\div 8=?$
2×6, or $6\times 2=?$	$\frac{1}{2}$ of 12, or $12\div 2=?$	$\frac{1}{6}$ of 12, or $12\div 6=?$
2×9, or $9\times 2=?$	$\frac{1}{2}$ of 18, or $18\div 2=?$	$\frac{1}{9}$ of 18, or $18\div 9=?$
2×7, or $7\times 2=?$	$\frac{1}{2}$ of 14, or $14\div 2=?$	$\frac{1}{7}$ of 14, or $14\div 7=?$
2×11, or $11\times 2=?$	$\frac{1}{2}$ of 22, or $22\div 2=?$	$\frac{1}{11}$ of 22, or $22\div 11=?$
2×10, or $10\times 2=?$	$\frac{1}{2}$ of 20, or $20\div 2=?$	$\frac{1}{10}$ of 20, or $20\div 10=?$
2×12, or $12\times 2=?$	$\frac{1}{2}$ of 24, or $24\div 2=?$	$\frac{1}{12}$ of 24, or $24\div 12=?$
2×1, or $1\times 2=?$	$\frac{1}{2}$ of 2, or $2\div 2=?$	.....
3×2, or $2\times 3=?$	$\frac{1}{3}$ of 6, or $6\div 3=?$	$\frac{1}{2}$ of 6, or $6\div 2=?$
3×4, or $4\times 3=?$	$\frac{1}{3}$ of 12, or $12\div 3=?$	$\frac{1}{4}$ of 12, or $12\div 4=?$
3×6, or $6\times 3=?$	$\frac{1}{3}$ of 18, or $18\div 3=?$	$\frac{1}{6}$ of 18, or $18\div 6=?$
3×8, or $8\times 3=?$	$\frac{1}{3}$ of 24, or $24\div 3=?$	$\frac{1}{8}$ of 24, or $24\div 8=?$
3×10, or $10\times 3=?$	$\frac{1}{3}$ of 30, or $30\div 3=?$	$\frac{1}{10}$ of 30, or $30\div 10=?$
3×12, or $12\times 3=?$	$\frac{1}{3}$ of 36, or $36\div 3=?$	$\frac{1}{12}$ of 36, or $36\div 12=?$
$3\times 3=?$	$\frac{1}{3}$ of 9, or $9\div 3=?$	.....
3×5, or $5\times 3=?$	$\frac{1}{3}$ of 15, or $15\div 3=?$	$\frac{1}{5}$ of 15, or $15\div 5=?$
3×7, or $7\times 3=?$	$\frac{1}{3}$ of 21, or $21\div 3=?$	$\frac{1}{7}$ of 21, or $21\div 7=?$
3×9, or $9\times 3=?$	$\frac{1}{3}$ of 27, or $27\div 3=?$	$\frac{1}{9}$ of 27, or $27\div 9=?$
3×11, or $11\times 3=?$	$\frac{1}{3}$ of 33, or $33\div 3=?$	$\frac{1}{11}$ of 33, or $33\div 11=?$
3×1, or $1\times 3=?$	$\frac{1}{3}$ of 3, or $3\div 3=?$	.....

Pupils may return to this page from time to time and drill briefly upon the facts given here, until they are fully mastered.



5 nickels | 5 cents or 5¢ | 5 dimes

4 quarters | 1 dollar or $1 | 2 half-dollars

Answer all you can orally.

1. How many cents equal a nickel?

2. How many nickels equal a dime? How many cents equal a dime?

3. How many nickels equal a quarter? How many cents equal a quarter?

4. How many quarters equal a half-dollar? How many dimes equal a half-dollar? How many nickels equal a half-dollar?

5. Which would you rather have, 1 dollar or 2 half-dollars? 1 dollar or 4 quarters? 1 dollar or 10 dimes?

6. What two pieces of money equal a dime?

7. What three pieces of money equal a quarter?

8. What two pieces of money equal seventy-five cents? What three pieces?

9. What two pieces of money equal a dollar? What three pieces? What four pieces?

10. To how many quarters are two dollars equal? Four dollars? Five and one-half dollars?

11. In a shorter way, write: 7 dollars; 9 dollars; 12 dollars; 19 dollars; 20 dollars; 25 dollars; 16 dollars; 1 dollar; 4 dollars.

1. A boy bought a top for 25 cents, and paid for it in nickels. How many nickels did he pay for it?

2. A 30-cent book is bought with a half-dollar. How many dimes may be used to make the change?

3. A package of flower seeds costs 10 cents. How many quarters will pay for five packages?

4. How many 5-cent car fares can be paid with a quarter? With 15 cents?

5. Harry has 5 dimes in his bank. John has 1 quarter and 2 dimes in his. Which has the more money? How much?

6. At 10 cents each, how many balls can be bought for a quarter, a dime, and a nickel together?

7. A pound of candy costs 50 cents. How much can be bought for $1? For 25 cents? For 75 cents? For 10 cents?

8. How many 50-cent pieces will pay for a chair that costs $5? For a chair that costs $6?

9. A sled costs $1.50. How many 25-cent pieces, or quarters, will be required to pay for it?

10. Joe bought a book for 30 cents, paper for 25 cents, and two pencils at 10 cents each. How much did he pay for all? What two pieces of money would pay for them? What four pieces?

11. A gill of cream costs a nickel. How many nickels will pay for a quart?

12. Thirty cents pays for a bushel of oats. How many nickels will pay for two pecks?

13. One pound of seeds costs a dollar. What part of a dollar will pay for four ounces?

14. A box of blacking costs a dime. How many boxes can you buy for 60 cents?

1. Draw the face of a watch, and fasten to the center two movable hands.

2. Show how far the minute hand moves in an hour. Show how far the hour hand moves in an hour.

3. How many minutes make an hour?

4. How many minutes are there in half an hour? How many in one-fourth, or one-quarter, of an hour?

5. Place the hands to show one o'clock.

6. Show where the hands are at thirty minutes after one, or half past one.

7. Show where the hands are at fifteen minutes after one, or quarter past one.

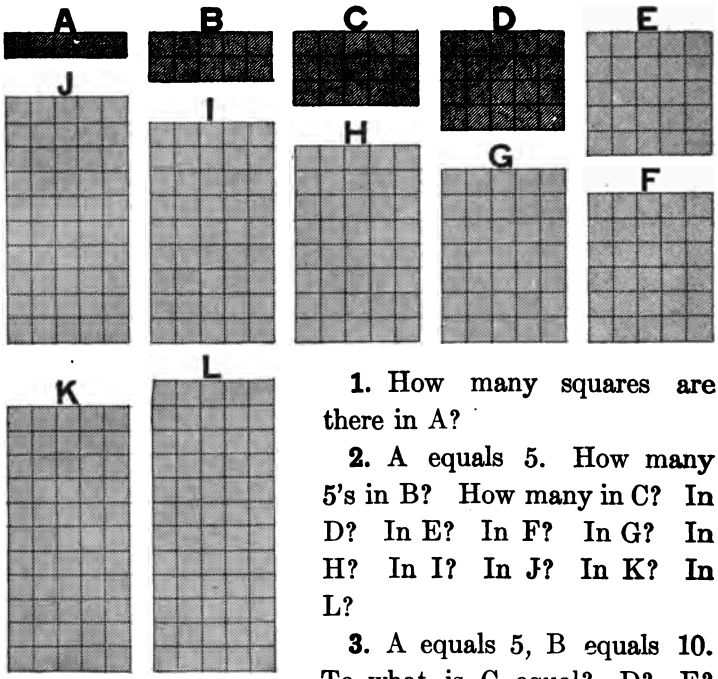
8. Move the hands to show the time of the opening of school in the morning; the beginning of recess; the closing of school at noon; the opening and closing of school in the afternoon.

9. How many minutes of school are there in the morning before recess? After recess? In the afternoon?

10. What part of an hour is a recess of fifteen minutes.

11. A man works eight hours a day. What part of a day does he work?

12. A man spent 3 months in Iowa, 3 months in Missouri, and 3 months in Arkansas. What part of a year did he spend in each state? In the 3 states?



1. How many squares are there in A?

2. A equals 5. How many 5's in B? How many in C? In D? In E? In F? In G? In H? In I? In J? In K? In L?

3. A equals 5, B equals 10. To what is C equal? D? E? F? G? H? I? J? K? L?

4. Count by 5's from 5 to 60.

5. A equals what part of B? What part of C? Of D? Of E? Of F? Of G? Of H? Of I? Of J? Of K? Of L?

6. 5 equals what part of 10? What part of 15? Of 20? Of 25? Of 30? Of 35? Of 40? Of 45? Of 50? Of 55?

7. B equals how many A's? B equals what part of D? Of F? Of H? Of J? Of L?

8. Four 5's equal how many 4's? See D.

9. Four 5's equal how many 10's? See B and D.

10. Six 5's equal how many 6's? See F.

1. 10 equals how many 5's? 10 is what part of 20? Of 30? Of 40? Of 50? Of 60?

2. C equals how many A's? C is what part of F? Of I? Of L?

3. 15 equals how many 5's? What part of 30? Of 45? Of 60?

4. D equals how many A's? How many B's? What part of H? Of L?

5. 20 equals how many 5's? How many 10's? What part of 40? Of 60?

6. E equals how many A's? What part of J?

7. 25 equals how many 5's? What part of 50?

8. 30 equals how many 5's? 10's? What part of 60?

9. A and B together are what part of F?

TABLE OF FIVES

$5\times1=5$	$5\times4=20$	$5\times7=35$	$5\times10=50$
$5\times2=10$	$5\times5=25$	$5\times8=40$	$5\times11=55$
$5\times3=15$	$5\times6=30$	$5\times9=45$	$5\times12=60$

10. What is one-fifth of 5? Of 15? 10? 20? 25? 45? 55? 35? 50?

11. Divide each of the following numbers by 5: 10; 30; 40; 50; 60; 5; 15; 25; 35; 45; 55.

2	12	22	3	13	23	4	14	24	5	15	25
32	**5**	42	33	**5**	43	34	**5**	44	35	**5**	45
52	62	72	53	63	73	54	64	74	55	65	75

12. Add the center number to each number in the same large square. Subtract it from each number larger than itself.

1. A train leaves one station at ten minutes after twelve, and arrives at the next at half past twelve. How many minutes does it take to go from one station to the other? What part of an hour?

2. A man closes his store and starts for home at six o'clock. He walks home in a quarter of an hour. What time is it when he reaches home?

3. A man begins work at eight o'clock and stops at half past five. How many hours a day does he work if he rests an hour at noon?

4. Mary is six years old and Jennie is six and three-fourths years old. How many months older is Jennie than Mary?

5. School begins at 9 o'clock and closes at half past 3. How many hours between the opening and the closing time? An hour and a half are allowed at noon, and half an hour for recesses. How many hours are pupils in school during 1 day?

6. A farmer owned eighteen horses. He sold six. How many had he left? What part of 18 had he left?

7. A man mailed nine letters at one time and six at another. How many did he mail altogether?

8. From a bunch of eighteen bananas, nine bananas were sold. How many remained?

9. There were twenty sheep in one pen, and ten in another. How many in both? If five were taken out of each pen, how many remained in the pens?

10. A game began at 2 in the afternoon and lasted until 15 minutes after 5. How many hours and what part of an hour did the game last?

11. A concert 2 hours long was how many minutes long?

1. How long a string will reach around the frame of a slate that is 8 inches long and 5 inches wide?

2. A box five inches high is twice as wide as it is high. How wide is it? Its length equals the sum of its width and height. How long is it?

3. By cleaning walks, Edwin earned a quarter on Monday, a dime on Tuesday, and a nickel on Wednesday. How much did he earn in the three days?

4. One jar holds five pints, another holds seven pints. How many pints do both hold? How many quarts?

5. A ship leaves one port at noon on Monday and arrives at her next port at noon on Saturday. How many days was she on the way?

6. In a class of fifteen pupils there were five more girls than there were boys. How many girls were there in the class? How many boys?

7. A car goes five miles an hour. How many hours will it take to go ten miles? To go twenty-five miles?

8. Fifteen acres of land are divided into three equal fields. How many acres are there in each field?

9. When it is a quarter past nine o'clock, how many minutes past nine is it?

10. How many pints of oil are there in a can holding fifteen quarts?

11. A table is 4 feet long and 3 feet wide. A leaf 1 foot wide and 3 feet long is put in. How many square feet does the table then contain?

12. A piece of sidewalk seven feet long contains thirty-five square feet. How wide is it?

13. Henry bought 10 newspapers for 15 cents and sold them at 3 cents each. How much money did he gain?

1. If a peck of beans costs 40 cents, what will one quart cost?

2. How many 4-quart pails may be filled from 17 quarts of milk? How many quarts will be left?

3. A man started for town at ten minutes to nine, and arrived at twenty minutes after nine. How many minutes was he on the way? What part of an hour?

4. A garden six yards long is one-half as wide as it is long. How many yards of fence will go around it?

5. A grocer bought a ten-pound tub of butter, and a five-pound tub of butter. How many pounds did he buy? How many jars holding five pounds each could he fill with the butter?

6. How many dollars are equal to three five-dollar bills? Four five-dollar bills? Five ten-dollar bills?

7. When 16 cents is paid for twelve eggs, how many cents must be paid for six eggs?

8. There are twenty days of school in a month. Louis was absent five days. What part of the school month was he absent?

9. How many pairs of shoes at $2 a pair can be bought for $15? How much money will be left?

10. The rent of one house is $30 a month. The rent of another is one-half as much. What is the rent of the second house? Of both houses?

11. A signboard contains thirty-six square feet. If the signboard is six feet long, how wide is it? If it is nine feet long, how wide is it?

12. An automobile made a trip at the rate of a mile in 3 minutes. The trip was made in an hour. How many miles were traveled?

1. From a gallon of syrup, a quart and a pint are taken. How much syrup is left?

2. How many bags holding six pecks each will be required to hold six bushels of corn?

3. A train leaves one station at fifteen minutes after one, and reaches the next station half an hour later. At what time does it reach the second station?

4. What is the weight of three packages, two of which weigh ten ounces each, and one, five ounces?

5. A rectangular lot, containing sixty square yards, is twelve yards long. How wide is it?

6. If one pound of coffee costs 32 cents, what will four ounces cost?

7. A boy left home at eight o'clock in the morning and returned at noon. How many hours was he away? What part of the day was he away?

8. A rope is cut into 4 equal parts. One part is 3 feet long. What was the length of the rope?

9. In a basket of fruit there are 2 dozen pears. If half a dozen are taken out, how many are left?

10. The glass in a picture frame is two feet wide and three feet long. How many square feet are there in its surface?

11. A clock is fifteen minutes fast. What is the correct time when the clock shows half past three?

12. With what three pieces of money can five 3-cent car fares be paid?

13. If one peck of potatoes costs 25 cents, what will three pecks cost? Four pecks?

14. There were 12 pages in each chapter and 2 chapters in each part of a book having 2 parts. How many pages were in the book? How many pages were in each part?

1. Name the days of the week.

2. How many days are there in one week?

3. What part of the week is one day? Two days?

4. How many school days are there in one week? In three weeks? In five weeks?

5. How many days of the week are called working days?

6. How many more working days than school days are there in five weeks?

7. How many weeks are there in a month?

8. One week is what part of a month? Two weeks are what part? Three weeks are what part?

9. Name the months of the year.

10. How many months are there in a year?

11. What part of a year is one month? Three months? Six months?

12. What part of a year are the winter months? The spring? The summer? The autumn?

13. From 7 o'clock one morning to 7 the next morning is how many hours?

14. What is this number of hours called?

15. From noon to the next noon is how many hours?

16. A girl walked from half past eleven until half past twelve. How many hours did she walk?

17. John stayed at his uncle's from 10 o'clock Monday morning till 10 o'clock Wednesday morning. How many days did he stay? How many hours?

18. If you have breakfast at 6 in the morning and supper at 6 in the evening, how many hours between breakfast and supper?

19. How many hours from a 7 o'clock breakfast to a luncheon at 1 in the afternoon?

EXERCISES ON FOURS AND FIVES

Read the lines across the page, answering the questions. Then read the columns from the top downward.

4×3, or $3\times 4=?$	$\frac{1}{4}$ of 12, or $12\div 4=?$	$\frac{1}{3}$ of 12, or $12\div 3=?$
4×9, or $9\times 4=?$	$\frac{1}{4}$ of 36, or $36\div 4=?$	$\frac{1}{9}$ of 36, or $36\div 9=?$
4×5, or $5\times 4=?$	$\frac{1}{4}$ of 20, or $20\div 4=?$	$\frac{1}{5}$ of 20, or $20\div 5=?$
$4\times 4=?$	$\frac{1}{4}$ of 16, or $16\div 4=?$	.....
4×2, or $2\times 4=?$	$\frac{1}{4}$ of 8, or $8\div 4=?$	$\frac{1}{2}$ of 8, or $8\div 2=?$
4×6, or $6\times 4=?$	$\frac{1}{4}$ of 24, or $24\div 4=?$	$\frac{1}{6}$ of 24, or $24\div 6=?$
4×8, or $8\times 4=?$	$\frac{1}{4}$ of 32, or $32\div 4=?$	$\frac{1}{8}$ of 32, or $32\div 8=?$
4×12, or $12\times 4=?$	$\frac{1}{4}$ of 48, or $48\div 4=?$	$\frac{1}{12}$ of 48, or $48\div 12=?$
4×7, or $7\times 4=?$	$\frac{1}{4}$ of 28, or $28\div 4=?$	$\frac{1}{7}$ of 28, or $28\div 7=?$
4×11, or $11\times 4=?$	$\frac{1}{4}$ of 44, or $44\div 4=?$	$\frac{1}{11}$ of 44, or $44\div 11=?$
4×10, or $10\times 4=?$	$\frac{1}{4}$ of 40, or $40\div 4=?$	$\frac{1}{10}$ of 40, or $40\div 10=?$
4×1, or $1\times 4=?$	$\frac{1}{4}$ of 4, or $4\div 4=?$	.....
5×6, or $6\times 5=?$	$\frac{1}{5}$ of 30, or $30\div 5=?$	$\frac{1}{6}$ of 30, or $30\div 6=?$
5×10, or $10\times 5=?$	$\frac{1}{5}$ of 50, or $50\div 5=?$	$\frac{1}{10}$ of 50, or $50\div 10=?$
5×7, or $7\times 5=?$	$\frac{1}{5}$ of 35, or $35\div 5=?$	$\frac{1}{7}$ of 35, or $35\div 7=?$
5×11, or $11\times 5=?$	$\frac{1}{5}$ of 55, or $55\div 5=?$	$\frac{1}{11}$ of 55, or $55\div 11=?$
5×2, or $2\times 5=?$	$\frac{1}{5}$ of 10, or $10\div 5=?$	$\frac{1}{2}$ of 10, or $10\div 2=?$
5×12, or $12\times 5=?$	$\frac{1}{5}$ of 60, or $60\div 5=?$	$\frac{1}{12}$ of 60, or $60\div 12=?$
5×8, or $8\times 5=?$	$\frac{1}{5}$ of 40, or $40\div 5=?$	$\frac{1}{8}$ of 40, or $40\div 8=?$
5×3, or $3\times 5=?$	$\frac{1}{5}$ of 15, or $15\div 5=?$	$\frac{1}{3}$ of 15, or $15\div 3=?$
$5\times 5=?$	$\frac{1}{5}$ of 25, or $25\div 5=?$	.....
5×4, or $4\times 5=?$	$\frac{1}{5}$ of 20, or $20\div 5=?$	$\frac{1}{4}$ of 20, or $20\div 4=?$
5×9, or $9\times 5=?$	$\frac{1}{5}$ of 45, or $45\div 5=?$	$\frac{1}{9}$ of 45, or $45\div 9=?$
5×1, or $1\times 5=?$	$\frac{1}{5}$ of 5, or $5\div 5=?$	.....

The pupil may return to this page occasionally and drill briefly on the facts until they are mastered.

1. A tablet cost 25 cents and a reader 50 cents. Find the cost of both.

25
50

How many dimes and cents in the sum?

2. I sold a peck of apples for 25 cents and a cake for 23 cents. How much did I receive?

25
23

How many dimes and cents in the sum?

3. What is the cost of a dozen eggs at 26 cents and one pound of flour at 3 cents?

26
3

How many dimes and cents in the sum?

4. What must I pay for a tablet at 6 cents and a pencil at 5 cents?

6
5

Eleven cents equals how many dimes and cents?

5. What is the cost of a pound of butter at 26 cents and a peck of apples at 15 cents?

26
15

26¢ equals how many dimes and how many cents? 15¢ equals how many dimes and how many cents? 26¢ + 15¢ =?

6. Write in figures and answer:

1 ten and 6 + 1 ten and 4 =?
1 ten and 8 + 1 ten and 3 =?
1 ten and 7 + 1 ten and 6 =?
2 tens and 9 + 1 ten and 5 =?
5 tens and 5 + 3 tens and 7 =?

7. Read the following as ones, and as tens and ones: 21, 32, 56, 49, 64, 73, 78, 87, 89, and 91.

8. Add:

16 inches		18¢	13 pounds		16 bushels	
12 inches		11¢	14 pounds		13 bushels	
20	22	21	56	58	51	64
13	11	18	42	31	27	54

1. John's bowstring was 19 inches long and William's was 2 inches longer than John's. How long was William's bowstring?

2. Mary sewed a seam 13 inches long and Kate sewed a seam 18 inches longer than the one Mary sewed. How long was Kate's seam?

3. Adam made a bench 18 inches long for the porch, and George made a bench 29 inches long. How long were the two benches together?

4. Add:

18	14	18	16	17	16	18	19	15	13	19
13	17	15	18	17	17	14	19	19	17	12

5. How many 10's are there in the answer in each problem just given? Why are there 3 tens in the answers and only 2 tens in the 10's columns of numbers added?

6. Add:

14	18	17	16	13	14	15	12	16	18	14
17	16	17	17	19	14	19	18	16	11	17
15	14	15	12	15	17	15	19	16	15	11

7. In each case in problem 6, how many 10's are there in the answer? Why are there four 10's in the answer and only three 10's in the 10's column of the numbers to be added?

8. Add:

12	14	16	12	18	14	15	14	18	17	17
13	15	18	17	19	15	18	17	18	16	17
19	17	19	19	16	18	19	19	18	19	17

9. In each case in problem 8, read the answer as ones and as tens and ones.

1. A lady paid 47 cents for some velvet, 15 cents for strawbraid, and 34 cents for lace. How much did she pay for all?

2. There are three mother hens in a barnyard and each has a brood of little chickens. One has 15, another 14, and the third 13. How many little chickens are there altogether?

3. What is the cost of a pound of butter at 28¢, a dozen eggs at 16¢, and a dozen oranges at 35¢?

4. What is the cost of a box of writing-paper at 35¢, a story book at 47¢, and a paper-knife at 29¢?

5. In each problem add first from the bottom and then prove by adding from the top:

24	26	27	28	29	29	45
13	39	29	38	38	59	15
25	17	28	48	27	19	59
84	32	76	82	7	96	24
19	17	19	9	29	9	59
9	58	19	19	79	8	18

6. James earned $46, Herman $29, and Adam $18. How many dollars did they all earn?

7. On the first shelf of a bookcase were 58 books, on the second 27, and on the third 26. How many books were on the three shelves?

8. In a jeweler's window there were 3 cases of rings. In the first case there were 27, in the second 59, and in the third 18. How many rings were in the three cases?

9. Charlie rode on his wheel 24 miles one day, 22 the second day, and 25 the third. How far did he ride in all?

1. A boy had 289 stamps. He bought 195 more and his father gave him 48. How many stamps had he then?

289
195
48

What is the sum of the ones?

How many tens does the sum of the ones contain? (Write the ones.)

To what column must the tens be added?

What is the sum of *all* the tens?

How many hundreds does it contain? (Write the tens.)

What is the sum of all the hundreds? (Write it.)

2. A miller sold 247 barrels of flour to one man, 256 to another, and 323 to another. How many barrels of flour did he sell to all?

3. A newsboy sold 209 papers on Monday, 187 on Tuesday, 193 on Wednesday, 197 on Thursday, 178 on Friday, and 227 on Saturday. How many did he sell during the week?

4. In each problem add both upward and downward:

143	354	145	252	178	627	147
342	435	514	145	296	192	296
235	143	152	243	342	184	499

5. A farmer owned 144 sheep, 279 hogs, and 298 cattle, How many animals did he own?

6. An automobile made a run of 178 miles one day, 164 miles the next day, and 159 miles the third day. How many miles were made in the three days?

7. On three different days a store made sales amounting to these sums: $175, $186, and $197. What was the sum of the sales of these three days?

1. A farmer kept fifteen sheep in one field, twenty-four in another, thirty-one in another, and forty-three in another. How many sheep did he have in all the fields?

2. George earned $53 in the winter, $43 in the spring, $25 in the summer, and $34 in the fall. How many dollars did he earn in the whole year?

3. A man traveled one hundred thirty-five miles the first week, two hundred fifty-four miles the second week, and five hundred forty-one miles the third week. How far did he travel in the three weeks?

4. I paid $135 for a horse, $154 for a carriage, and $23 for harness. How much did the horse and carriage cost? How much did they all cost me?

5. How long a line will it take to go around a house that is thirty-six feet long and twenty-eight feet wide? To go around it three times?

6. Arthur earns $17 in one month and William earns $14. If their father earns as much as both of them, how much does he earn? How much do the three earn?

7. Mr. Stone bought a lot for $354, filled it in at a cost of $125, and built a fence around it at a cost of $70. What did the whole cost?

8. In going a journey a man drove 29 miles west, 30 miles north, 46 miles west again, and 28 miles north. How long was the journey?

9. The repairs on an automobile cost $14 at one time, $25 at another, $27 at another, and $52 at another. How much money was paid for repairs?

10. A butcher bought three calves. One weighed 152 pounds, another 113 pounds, and a third 148 pounds. How much did they weigh altogether?

1. A boy earned \$78 and spent \$54. How much did he have left?

2. Clara read 42 pages of her book containing 96 pages. How many pages remained to be read?

3. A girl saved 68¢ (from her allowance of one dollar) and spent 32 cents. How much more did she save than she spent?

4. From	78 gallons		89 pounds		97 feet	\$67
take	43 "		35 "		63 "	43
5. From	43	54	67	89	354	597
take	11	21	34	45	142	423
6. From	22	24	28	25	32	43
take	16	18	19	17	26	38

7. John had 92¢ and gave 38¢ to Albert. How much had he left?

92¢ 92 cents equals how many dimes and how
38¢ many cents?
54¢ Can you take 8 cents from 2 cents?

If one dime is changed into cents, can you then take 38 cents from 92 cents?

8. John had 92 marbles and gave away 38 marbles. How many had he left?

9. From	31	65	42	72	40	53	47
take	17	48	24	57	27	27	18
10. From	71	94	81	91	84	62	73
take	13	45	54	45	25	33	15

11. From a spool of thread containing 50 yards, 27 yards were used. How many yards were left?

1. Read each number in the following problems, first as dimes and cents, then as tens and ones.

From	75	64	83	96	82	97	88
take	37	29	48	77	55	49	29

2. Subtract:

41	32	84	71	35	94	43	87
19	14	69	38	16	67	29	58

3. Grace bought 37 marbles and gave 19 of them to Madge. How many had she left?

4. James read 25 pages of his book, which had in it 41 pages. How many pages had he yet to read?

5. Elizabeth had 72 cents, 48 of which she earned. The rest was given to her. How much was given to her?

6. Ethel made 64 fudges and gave away 27 of them. How many were left?

7. John earned 27¢ toward paying for a clock which will cost 65¢. How much has he yet to earn?

8. Alice bought 20 ounces of lemon candy and gave away 13 ounces. How much had she left?

9. Paul set out 58 tomato plants and all but 19 lived. How many lived?

10. Subtract:

88	76	87	75	86	74	85	73
29	37	49	37	58	39	46	48
68	91	82	73	64	95	86	77
59	59	49	39	58	69	69	48

11. $27-18=?$ $35-29=?$ $48-29=?$

$37-19=?$ $42-14=?$ $75-69=?$

1. 48 pounds of flour were taken from a barrel holding 192 pounds. How many pounds remained?

From 192 pounds
take 48 "

Add the difference and the lower number (48). To what number is the sum equal?

2. John had $6.22 and he gave $2.55 to Henry. How much had he left?

$6.22
2.55
$3.67

Notice, 22¢ is the same as 1 dime and 12¢. How many dimes are left in dimes' place in the upper number after the change?

Notice that $6 and 1 dime is the same as $5 and 11 dimes. What remains in the dollars' place of the upper number?

3. Mr. White had 622 books and he sold 255 of them. How many had he left?

4.

From	311	722	416	328	632
take	123	499	298	199	594

5. A man earned $222 and spent $198 for a horse. How much money had he left?

6. A farmer sold a lot for $360, which was $171 more than it cost. What was the cost of the lot?

7. 280 feet of molding is used for the second story of a house and 192 feet for the third story. How much more is used for the second than for the third story?

8. Clara's purse contains $3.63. If she spends $2.76 for books, how much money will be left?

9. A farmer having 262 sheep, sold 178. How many had he left? Test. (See problem 1.)

10. James was flying his kite with 300 feet of string. The string broke, leaving 234 feet in his hands. How many feet of string went with the kite? Test.

1. Mr. White bought a horse for $175 and sold it for $210. How much did he gain?

2. It cost Mr. Black $135 to put a new roof on his stable. He paid all but $39 of this sum. How much did he pay?

3. A druggist bought 250 boxes of soap. He sold 168 boxes. How many were left unsold?

4. A man traveled 176 miles of a journey of 360 miles. How far had he still to travel?

5. A woman owed $275 for a piano. After paying $187, how much did she still owe?

6. Subtract:

280	311	702	863	524	605	237
178	126	345	679	235	517	148
790	800	310	671	822	443	924
637	518	129	218	213	159	647
818	507	686	400	825	727	690
729	318	428	217	636	419	528

7. John earned $525 a year and his expenses were $347. How much did he save?

8. A fire was lighted in an old furnace and 310 chimney swallows fell down, blinded by the smoke. When they were taken to the air 128 flew away, but the rest died. How many died?

9. From a crib containing 213 bushels of corn 136 bushels were used. How many bushels were left in the crib?

10. Four hundred fifteen first readers were bought, but only three hundred forty-six were sold. How many were still on hand?

1. What is the cost of 2 dozen eggs at 23¢ a dozen?

Add	Multiply	
23¢	23¢	2 times 3 cents =?
23¢	by 2	2 times 2 dimes =?
46¢	46¢	

2. Find the cost of 3 tin pails at 22¢ each.

3. James has 21 marbles. Henry has 4 times as many. How many has Henry?

4. Multiply:

34	23	44	32	31	42	62
2	3	2	4	5	3	4

5. Find the cost of 3 yards of cloth at 58¢ a yard?

Add	Multiply	
58¢	58¢	3 times 8 cents equals
58¢	by 3	how many dimes and
58¢		how many cents?
		3 times 5 dimes equals
		how many dimes?

What is the sum of all the dimes? 3 times 58¢ =?

6. How many pounds of flour in three 58-pound sacks?

7. If one-fourth of a barrel of flour weighs 49 pounds, what does a whole barrel weigh?

8. Multiply:

36	28	57	38	76	41	45
2	3	2	4	3	5	4

9. How many ounces in 3 pounds? In 4 pounds?

10. Find the cost of a bushel of apples at 36¢ a peck.

11. How many feet of fence will it take to inclose a square lot, one of whose sides is 125 feet long?

12. Four wire ropes, each 243 feet long, are used to hold a large chimney in place. How many feet of rope are used in all?

1. A gardener set out 4 rows of trees, putting 82 trees in each row. How many trees did he set out?

2. If a person pays $4 a week for board, how much will he pay in a year, or fifty-two weeks?

3. There are twenty-four sheets of paper in a quire. How many sheets are there in five quires?

4. How many bushels of wheat are there in ninety-six bags, if each bag contains two bushels?

5. What will three pianos cost at $285 each?

6. A family uses thirty-eight quarts of milk in a month. How much will the milk bill amount to for a month at 5 cents a quart?

7. Multiply:

438	147	235	268	470	138	167	295
2	5	4	3	2	5	4	2
179	489	249	304	169	230	294	157
3	2	4	3	5	4	3	5

8. There are one hundred ninety-six pounds of flour in a barrel. How many pounds in four barrels?

9. Mr. Gates sold a horse for $87. I sold one for three times as much. How much did I receive?

10. If Mr. Field pays $36 for one month's rent, what will his rent be for five months?

11. One hundred ninety-six loaves of bread can be made from a barrel of flour. How many loaves can be made from five barrels of flour?

12. Dr. Allen pays $55 a year for his telephone. What will it cost him for four years?

13. At 5¢ each, what will 2 dozen crayon pencils cost? What will 28 such pencils cost?

1. Mr. Jones gave each of his 3 children $2.65 to spend for Christmas. How much did he give them?

2. A boy owned 3 kites, each of them having 155 feet of string. How much string had he?

3. Nellie had four brothers. She bought for each of them a pair of gloves costing $1.19. How much did all the gloves cost?

4. Harry gave a dinner to 4 of his friends. It cost him $1.90 for each person. What was the whole expense of the dinner?

5. Susan and two of her friends each made 144 chocolate creams for a party. How many did they all make?

6. Multiply:

248	327	299	185	619	298
2	3	4	5	2	3
269	158	317	192	261	458
2	3	4	5	4	2
257	196	184	219	313	471
3	4	5	4	3	2

7. A candy store keeper bought 4 barrels of mixed candy, each weighing 295 pounds. How many pounds did he buy in all?

8. Herman made a collection of United States stamps, one of German stamps, and a third of mixed stamps. There were 249 stamps in each collection. How many stamps had he altogether?

9. Amelia and her three sisters each had 193 buttons on her button string. How many buttons had they altogether?

1. Two boys bought the following articles to complete their camping outfit:

Two blankets at 75¢ each.

A frying-pan, a pail, and a coffee-pot, at 27¢ each.

Six yards of mosquito-netting at 5¢ a yard.

Two large boxes at 35¢ each.

Find (1) the cost of the blankets; (2) of the cooking-dishes; (3) of the netting; (4) of the boxes. How much did they pay for all?

2. Alice and Jane gave a party for which they bought the following:

Five pounds of candy at 38¢ a pound.

Four pounds of mixed nuts at 18¢ a pound.

Three quarts of ice-cream at 40¢ a quart.

Two cakes at 50¢ each.

Find the cost of (1) the candy; (2) the nuts; (3) the ice-cream; (4) the cakes; (5) all together.

3. John made for his sister a play house out of 4 large store boxes, each costing 15¢. They bought for the house:

Five yards of curtain calico at 3¢ a yard.

Three doll chairs at 13¢ each.

A small table at 25¢.

Find the cost of (1) the boxes; (2) the calico; (3) the chairs. How much did they spend for all?

4. Henry carried papers 178 days each year for 3 years. How many days did he carry papers in the 3 years? At 5 papers daily, how many did he deliver?

5. Herman bought 184 pigeons one year and the next year he sold 3 times as many. How many pigeons did he sell?

1. Mr. Blake divided 82 cents equally between his son and daughter. How much had each child?

Read 82 cents as dimes and cents.

2)82 One-half of 8 dimes equals how many dimes?

One-half of two cents equals how many cents?

One-half of 82 cents equals how many cents?

2. Fred had 82 stamps and he gave half of them to William. How many had each then?

3. Find:

$\frac{1}{2}$ of 24	2)24	$\frac{1}{2}$ of 28	2)28	$\frac{1}{2}$ of 60	2)60
$\frac{1}{3}$ of 36	3)36	$\frac{1}{3}$ of 63	3)63	$\frac{1}{3}$ of 39	3)39
$\frac{1}{3}$ of 66	3)66	$\frac{1}{3}$ of 93	3)93	$\frac{1}{3}$ of 96	3)96
$\frac{1}{4}$ of 48	4)48	$\frac{1}{4}$ of 84	4)84	$\frac{1}{4}$ of 44	4)44
$\frac{1}{4}$ of 80	4)80	$\frac{1}{4}$ of 88	4)88	$\frac{1}{4}$ of 120	4)120
$\frac{1}{5}$ of 55	5)55	$\frac{1}{5}$ of 50	5)50	$\frac{1}{5}$ of 155	5)155

4. 5)155 When you divide the 15 by 5 in this problem where do you write the 3? Why? Where do you write the 1? Why?

5. 2)124 2)102 3)156 3)120 4)168 4)204

6. Julia divided 126 shells into 3 equal piles. How many were there in each pile?

7. Elizabeth shared 183 pictures with her 2 sisters, keeping the same number she gave to each. How many did she keep?

8. Four boys sold 164 newspapers, each selling the same number. How many did each boy sell?

1. Mrs. Smith divided 32¢ equally between her two little girls. How much did each receive?

$2)32 = 20 + 12 = 32$
$10 + 6 = 16$

$\frac{1}{2}$ of 3 tens equals how many tens and how many over? One ten + 2 ones equals how many ones? $\frac{1}{2}$ of 12 ones = ?

$2)\overline{32}$
16

$\frac{1}{2}$ of 32, or 32 divided by 2 = ?

2. $2)54$ $2)38$ $2)56$ $2)34$ $2)36$ $2)58$

3. How many 2's, and how many ones over, in 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19?

4. How many 3's, and how many ones over, in 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, and 23?

5. How many 4's, and how many ones over, in 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36?

6. How many 5's, and how many ones over, in 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, and 39?

7. Seventy-five apples are separated into 3 equal piles. How many are there in each pile?

$3)\overline{75}$

How many 3's in 7? How many over? What is this 1? How many ones equal 1 ten and 5 ones? How many 3's in 15? How many 3's in 75?

8. There are 54 books in a case of 3 shelves, the same number on each shelf. How many are on each shelf?

9. $3)48$ $3)78$ $3)81$ $3)84$ $3)243$ $3)144$

$4)96$ $4)84$ $4)72$ $4)64$ $4)184$ $4)364$

1. A boat makes a trip of eight hundred forty miles in 5 days, going the same distance daily. How many miles does it run in one day?

2. In going to school and returning home, Henry has to walk nine hundred seventy-eight yards. How far does he live from the schoolhouse?

3. A gardener puts 828 pounds of seed into four-pound sacks. How many sacks does he use?

$$4\overline{)828}$$
$$207$$

4. Divide the following numbers:

$2\overline{)290}$	$5\overline{)150}$	$4\overline{)180}$	$5\overline{)470}$	$3\overline{)987}$
$3\overline{)678}$	$5\overline{)345}$	$2\overline{)178}$	$3\overline{)171}$	$5\overline{)175}$
$4\overline{)896}$	$3\overline{)294}$	$4\overline{)188}$	$2\overline{)250}$	$5\overline{)250}$
$5\overline{)595}$	$4\overline{)372}$	$2\overline{)636}$	$4\overline{)272}$	$3\overline{)672}$

5. Mary's mother made 215 lemon cookies for the children to eat while they were camping. They camped 5 days. How many cookies would they have for each day?

6. Andrew bought a box containing 300 marbles. He divided them equally among four boys. How many marbles did each boy have?

7. One fall a boy watched 4 squirrels store acorns in a hollow tree. The next winter the tree was cut down and 288 acorns were found in it. If each squirrel carried the same number, how many acorns did one carry?

1. How many 2-cent stamps can be bought for $5.76?

2. At 3 cents a yard, how many yards of ribbon can be bought for $4.05?

3. Five boys have an equal share in 640 marbles. How many marbles does each boy own?

4. How many bottles of ink can be bought for $8.05, at 5 cents each?

5. $2\overline{)457}$ $228\frac{1}{2}$ How many 2's in 4? How many 2's in 5 and how many over? How many 2's in 17? How many remaining? Write the remainder thus: $\frac{1}{2}$, and place it to the right of the quotient.

6. Divide the following numbers:

$2\overline{)894}$	$2\overline{)895}$	$2\overline{)962}$	$2\overline{)769}$	$2\overline{)541}$
$3\overline{)217}$	$3\overline{)849}$	$3\overline{)755}$	$3\overline{)314}$	$3\overline{)375}$
$4\overline{)645}$	$4\overline{)474}$	$4\overline{)867}$	$4\overline{)716}$	$4\overline{)419}$
$5\overline{)600}$	$5\overline{)736}$	$5\overline{)598}$	$5\overline{)807}$	$5\overline{)670}$

7. How many feet in one side of a square whose perimeter (distance around) is 588 feet?

8. The perimeter of a rectangle is 585 feet. How many yards are there in it?

9. At 4¢ a dozen, how many dozen buttons can you buy for $3.37?

10. A train traveled 129 miles in 3 hours. How many miles did it travel each hour?

11. At 4¢ a pound, how many pounds of sugar can you buy for $4.86?

12. At $3 a barrel, how many barrels of apples can be bought for $75?

A LAUNDRY BILL FOR ONE MONTH

LIST	Price for Each Piece	NUMBER OF PIECES			
		First Week	Second Week	Third Week	Fourth Week
Collars	3¢	6	8	5	4
Cuffs, per pair	5¢	4	5	6	3
Handkerchiefs	2¢	7	8	10	12
Towels	1¢	15	12	11	9
Aprons	5¢	2	3	3	4

1. How much did the collars cost each week? The cuffs? Handkerchiefs? Towels? Aprons?

2. What was the whole bill for each week?

3. How much did the collars cost for the whole month? The cuffs? Handkerchiefs? Towels? Aprons?

4. How much did the collars and cuffs together cost for each week? For the month?

5. At the prices on the bill, what will it cost to have 7 collars, 4 pairs cuffs, and 8 handkerchiefs laundered?

6. At the prices shown, find the amount of this laundry bill: 8 collars; 6 pairs cuffs; 12 handkerchiefs; 12 towels; 3 aprons.

7. Mr. Morgan's laundry bill for a month was

32 collars, 35 handkerchiefs, 6 aprons,
24 pairs cuffs, 42 towels, 10 shirts.

At the prices shown above, and shirts at 10 cents apiece, find the amount of the bill.

8. Add the bills of the 4 weeks and divide the sum by 4.

9. At the price given in the list, what would it cost to have five pieces of each kind laundered three different times?

10. Make a laundry bill for yourself.

1. Draw a line 2 inches long. Divide it into two equal parts. Let each inch stand for 1 foot. How many feet does the line stand for?

2. Let each inch stand for 1 yard. How many yards does the line stand for?

3. Draw a line 3 inches long. Let each inch stand for 1 yard. How many yards does the line stand for?

4. Draw a line 4 inches long. If each inch stands for 1 yard, how many yards does the line stand for?

5. Draw a line 1 inch long. Let it stand for 1 yard. How many feet does it stand for?

6. Draw a line 2 inches long. Let it stand for 2 yards. One-half of the line stands for what? One-half of the line means how many feet?

7. When one inch stands for 1 foot, a 4-inch line means how many feet?

8. When one inch stands for 1 yard, a 4-inch line stands for how many yards?

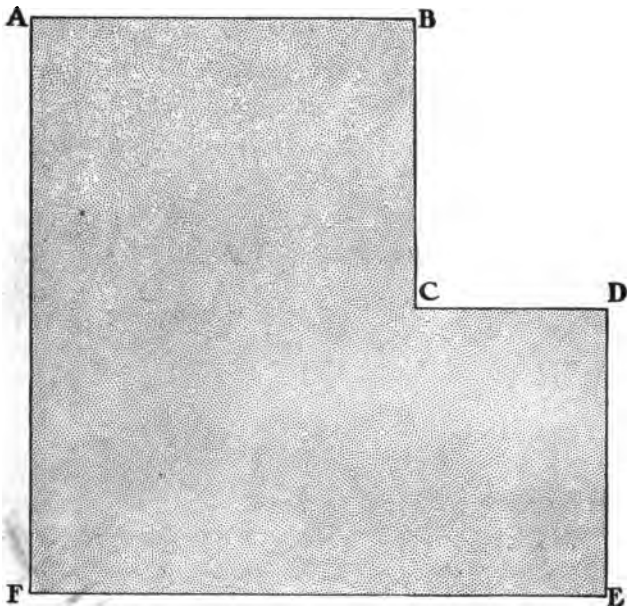
9. When one inch stands for 1 yard, a 4-inch line means how many feet?

10. Let 1 inch stand for 1 yard. Draw a 2-yard line; a 3-yard line; a 4-yard line. How long is each line? How many yards does each line stand for?

11. A table is 3 feet wide and 8 feet long. Draw a plan of it in which 1 inch shall stand for 1 foot. How long and how wide will your drawing be?

12. Draw a plan of a signboard 6 feet long and 3 feet wide. Make the drawing 1 inch wide and 2 inches long. In this drawing 1 inch will stand for how many feet?

13. A road ten miles long was shown on a map by a line 2 inches long. On this map one inch meant what length?



This picture is the plan of a lot drawn to the scale, 1 inch to 12 feet. This means that an inch on the drawing stands for a distance of 12 feet in the lot. Using the scale named, measure and give the following distances in the lot.

1. How many feet is it from A to B? From A to F?

2. How many feet is it from F to E? From D to E? From B to C? From C to D? From A through B to C? From A through F to E?

3. How many feet of fence are needed to fence the lot?

4. How many yards is it from A to F? From A to B? How many yards around the lot?

5. How many feet from A to C? From F to C?

6. How many yards from A to C? From F to C?

7. How many yards around the lot and from F to C over?

1. If the lot (page 83) were square with sides the length of A to F, how many yards around it? If square with sides the length of A to B, how many yards around it? If square with sides the length of B to C, how many yards around it?

2. How many steps, each 2 feet long, would one take in walking once around the lot described on page 83?

3. Add:

427	725	687	678	246	672
685	982	343	294	864	573
981	693	921	892	268	957
684	798	692	684	462	391

4. Subtract:

246	907	872	405	690	672
192	265	396	272	371	395

5. Multiply:

374	826	987	654	982	658
2	3	4	5	4	3

6. Divide:

2)147	3)765	4)729	4)912	5)675	3)405

7. A car is 64 feet long, how long is a train of 4 such cars? Of 5 such cars?

8. A boy lives 624 feet from the store. In going to the store and returning, how many feet will he walk? How many yards? In 4 trips to the store and back, how many yards will he walk?

9. A rail in the street car track is 10 yards long. How many rails in 50 yards of a single rail of track? In both rails of track? In all the rails of 2 tracks?

Answer all you can orally.

1. How many days are there in a week?

2. How many of these are working days?

3. How many working days in 2 weeks? In 3 weeks? In 4? In 5? In 6? In 7? In 8? In 9? In 10?

4. How many eggs in a half-dozen? In one and one-half dozen?

5. How many 6-inch rulers can be made from a stick 2 feet long? From a stick 5 feet long?

6. How many lamp wicks, each six inches long, can be made from a yard of wicking?

7. Allowing six inches for each wick, how many inches of wicking will be needed to furnish 9 lamps? For 11 lamps?

8. How many 6-inch hair ribbons will a yard of ribbon make?

9. A wheel that is 6 feet around the tire will turn how many times in going 36 feet? In going 48 feet?

10. A wheel that is 6 inches around the outside will turn how many times in rolling 2 feet?

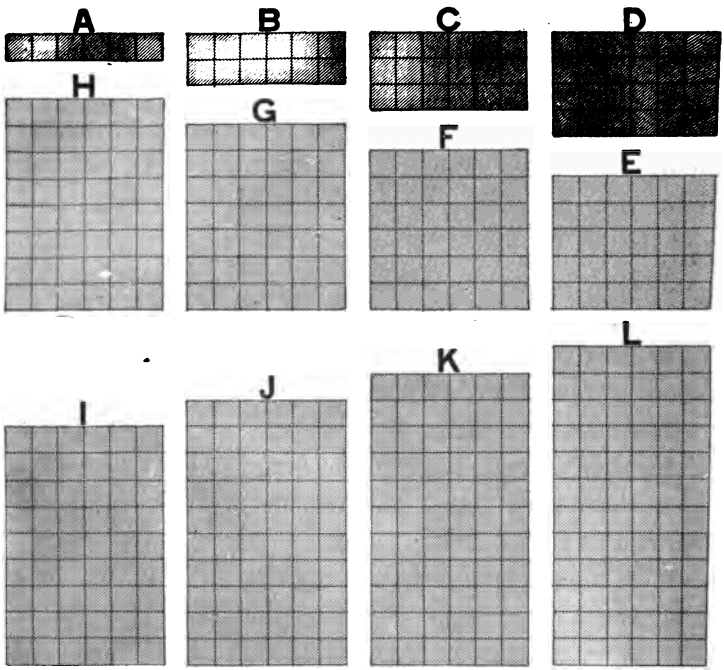
11. Julia found 30 eggs in the hay-mow. How many half-dozens did she find?

12. Mrs. Roe bought a half-dozen eggs each working day of the week. How many did she buy in all?

13. Fifty-four lemons are how many dozen lemons? How many half-dozens?

14. The oranges in a store window were arranged in 7 groups of a half-dozen each. How many oranges were in the window?

15. A milkman made the following sales of milk, at 6¢ a quart: 5 quarts; 3 quarts; 8 quarts; 6 quarts; 11 quarts. How much did he get for each sale? From all the sales?



1. How many squares are there in A? How many rows of six squares each in B? In C? In D? In E? In F? In G? In H? In I? In J?

2. A contains 6, B contains 12. How many in C? In D? In E? In F? In G? In H? In I? In J? In K? In L?

3. A equals what part of B? What part of C? Of D? Of E?

4. 6 is what part of 12? What part of 18? Of 24? Of 30? Of 36? Of 42? Of 48? Of 54? Of 60? Of 66? Of 72?

5. B equals how many A's? What part of D? Of F? Of H? Of J? Of L?

1. 12 equals how many 6's? What part of 24? Of 36? Of 48?

2. C equals how many A's? What part of F? Of I? Of L?

3. 18 equals how many 6's? What part of 36? Of 54? Of 72?

4. D equals how many A's? How many B's? What part of H? Of L?

5. 24 equals how many 6's? How many 12's? What part of 48? Of 72?

6. 30 equals how many 6's? What part of 60?

7. 36 equals how many 6's? How many 12's? How many 18's? What part of 72?

TABLE OF SIXES

$6\times1=6$	$6\times4=24$	$6\times7=42$	$6\times10=60$
$6\times2=12$	$6\times5=30$	$6\times8=48$	$6\times11=66$
$6\times3=18$	$6\times6=36$	$6\times9=54$	$6\times12=72$

2	12	22	3	13	23	4	14	24	5	15	25
32	**6**	42	33	**6**	43	34	**6**	44	35	**6**	45
52	62	72	53	63	73	54	64	74	55	65	75

6	16	26	7	17	27	8	18	28	9	19	29
36	**6**	46	37	**6**	47	38	**6**	48	39	**6**	49
56	66	76	57	67	77	58	68	78	59	69	79

8. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. The height of a tree is 72 feet, which is 6 times the distance around it at the ground. How many feet is it around it at the ground?

2. In one field a farmer has 96 sheep, which are one-sixth of his entire flock. How many sheep has he?

3. A piece of cloth is 54 yards long. One-sixth of it was sold at $2 a yard. How much was received from the sale? How much of the piece was left? How much was it worth at the same rate?

4. A man earns $71 a month and spends $52 a month, how much does he save in that time? How much does he save in 6 months?

5. A barrel holds $31\frac{1}{2}$ gallons. How many gallons will 6 barrels hold?

6. A mile from north to south is 8 blocks, and from east to west, 13 blocks. How many blocks will a boy travel in going 6 miles north and 6 miles west?

7. What is the cost of 27 yards of sewer pipe at $2 a foot?

8. How many weeks will it take a man to save $29 if he saves $3 each week?

9. How many square inches in a rectangle that is 6 inches long and 3 inches wide? (See page 40.) One that is 6 inches long and 6 inches wide? One that is 6 inches long and 8 inches wide? One that is 6 inches long and 12 inches wide?

10. Draw a 6-inch square.

11. A 2-inch square equals what part of a 6-inch square?

12. A 3-inch square equals what part of a 6-inch square?

13. 3 feet of length is called by what name? What is a figure 3 feet square called?

1. Cut from a newspaper a square foot of paper. Use it for a pattern and cut 8 more pieces. Make a square by placing these pieces on the floor. What are the dimensions of this square in feet? In yards?

2. One square yard equals how many square feet?

3. On page 40 suppose each small square were one foot square. How wide would the figure be? How long? How many square feet would it contain?

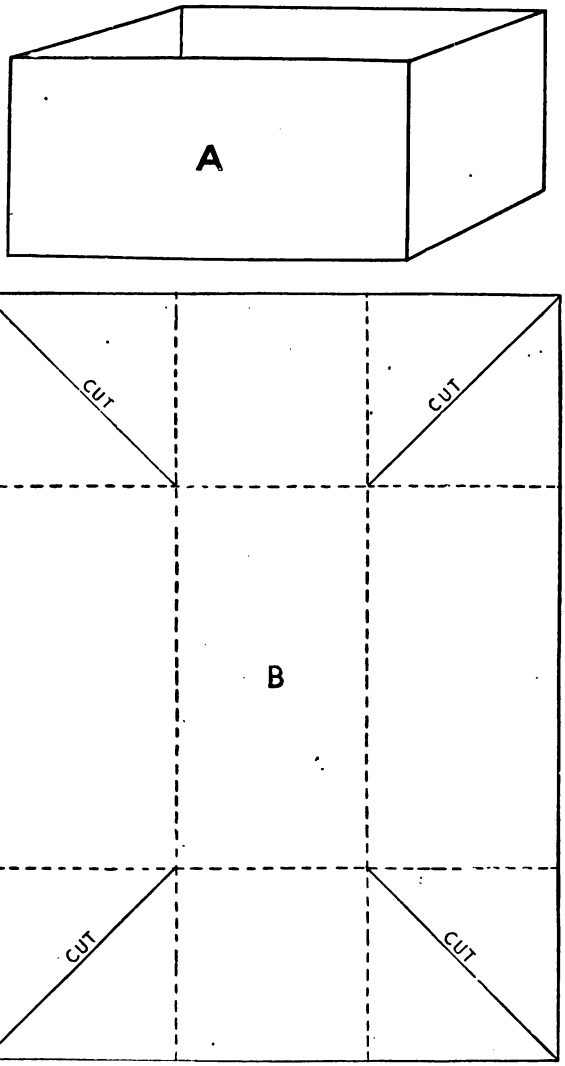
4. How many square yards in a figure 2 yards square? How many feet long is one side of such a figure? How many square feet does such a figure contain?

5. Draw figures containing 36 square inches. What different shapes might such figures be?

6. Two blotters each contained 12 square inches. One was 2 inches wide, the other was 3 inches wide. What was the length of each?

7. Read each line across the page and answer the questions. Then read each column from the top downward.

6×3, or $3\times 6=?$	$\frac{1}{6}$ of 18, or $18\div 6=?$	$\frac{1}{3}$ of 18, or $18\div 3=?$
6×9, or $9\times 6=?$	$\frac{1}{6}$ of 54, or $54\div 6=?$	$\frac{1}{9}$ of 54, or $54\div 9=?$
6×4, or $4\times 6=?$	$\frac{1}{6}$ of 24, or $24\div 6=?$	$\frac{1}{4}$ of 24, or $24\div 4=?$
6×5, or $5\times 6=?$	$\frac{1}{6}$ of 30, or $30\div 6=?$	$\frac{1}{5}$ of 30, or $30\div 5=?$
6×2, or $2\times 6=?$	$\frac{1}{6}$ of 12, or $12\div 6=?$	$\frac{1}{2}$ of 12, or $12\div 2=?$
$6\times 6=?$	$\frac{1}{6}$ of 36, or $36\div 6=?$	.....
6×8, or $8\times 6=?$	$\frac{1}{6}$ of 48, or $48\div 6=?$	$\frac{1}{8}$ of 48, or $48\div 8=?$
6×12, or $12\times 6=?$	$\frac{1}{6}$ of 72, or $72\div 6=?$	$\frac{1}{12}$ of 72, or $72\div 12=?$
6×7, or $7\times 6=?$	$\frac{1}{6}$ of 42, or $42\div 6=?$	$\frac{1}{7}$ of 42, or $42\div 7=?$
6×11, or $11\times 6=?$	$\frac{1}{6}$ of 66, or $66\div 6=?$	$\frac{1}{11}$ of 66, or $66\div 11=?$
6×10, or $10\times 6=?$	$\frac{1}{6}$ of 60, or $60\div 6=?$	$\frac{1}{10}$ of 60, or $60\div 10=?$
6×1, or $1\times 6=?$	$\frac{1}{6}$ of 6, or $6\div 6=?$	.....



1. How long is the box A? How deep? How many square inches in one side?

1. B is a piece of paper the size from which to cut such a box without a cover. How long is it? How wide? What is its area?

2. A box is 2 inches long, 2 inches wide and 2 inches high. How many square inches in the sides and bottom of the box?

3. What are the dimensions (length and breadth) of the piece of paper necessary to make it? What is its area?

4. What are the dimensions of the piece of paper necessary to make a box 3 inches long, 3 inches wide, and 3 inches deep, without a cover? What is the area of the paper?

5. What are the dimensions of a box 4 inches deep, that can be made, without a cover as in problem 1, from a piece of paper 12 inches long and 12 inches wide?

6. A box is 4 inches long, 3 inches wide and 2 inches deep. How large must the paper be in order to make it without a cover? How many square inches of paper are necessary?

7. How many square inches of leather are necessary to line a box that is 6 inches long, 2 inches wide, and 2 inches deep, without a cover, if there is no waste in cutting? What will the leather for such a box cost at 6¢ a square inch?

8. How many square feet of cloth are needed to line a box 6 feet long, 3 feet wide, and 2 feet deep, with a cover?

9. The length of a room is 6 yards, the width 5 yards, and the height 4 yards. How many square yards in one side of the room? In 2 sides? In one end wall? In both? In the ceiling? In the floor? In the entire inside surface of the room?

SALES

Paper	Price	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Tribune	2¢	5	8	3	4	6	7
Free Press	2¢	3	5	9	7	3	9
News	1¢	7	9	8	5	7	7
Enquirer	3¢	2	6	6	9	9	2
Herald	2¢	2	4	9	3	9	9
Dispatch	1¢	3	8	3	7	8	8
Post	2¢	4	2	7	5	9	9

Answer all you can orally.

Arthur Hall kept a newspaper stand and this table shows his sales for one week.

1. How many of each paper did he sell in the week?

2. How many of all papers did he sell in the week?

3. How many papers did he sell each day?

4. How much did he receive each day for the Tribune? Free Press? News? Enquirer? Herald? Dispatch? Post?

5. How much did he receive daily for all the papers?

6. What sum of money did he receive in the whole week for each one of the papers?

7. What sum of money had he received during the week from the sale of all the papers?

8. His pay was one-third of all he received. How much did he earn?

9. What paper sold best during the whole week?

10. What paper had the smallest sale for the week?

11. What paper brought in the smallest sum of money?

12. What paper sold best on Monday? Tuesday? Wednesday? Thursday? Friday?

13. Let pupils make and solve problems using the prices given above.

Answer all you can orally.

1. How many days are there in a week?

2. In 14 days there are how many weeks?

3. How many days are there in 2 weeks? In 3 weeks? In 4? In 5? In 6? In 7? In 8? In 9? In 10? In 11?

4. How many weeks are there in 21 days? In 28 days? In 35? In 42? In 49? In 63? In 84?

5. A woman bought a quart of milk each day of one week. How many pints did she buy in all?

6. In all the common years February has 28 days. How many weeks has February in common years?

7. Alice stayed with her grandmother 21 days. How many weeks was she there?

8. A boy sold newspapers every day for 63 days. How many weeks did he sell papers?

9. John is 7 years old and his brother William is 4 times as old as John. How old is William?

10. A girl spent 70¢ for ribbon. How many dimes did she spend?

11. Elsie is 7 years old. Her mother is 35 years old. How many times Elsie's age is her mother's age?

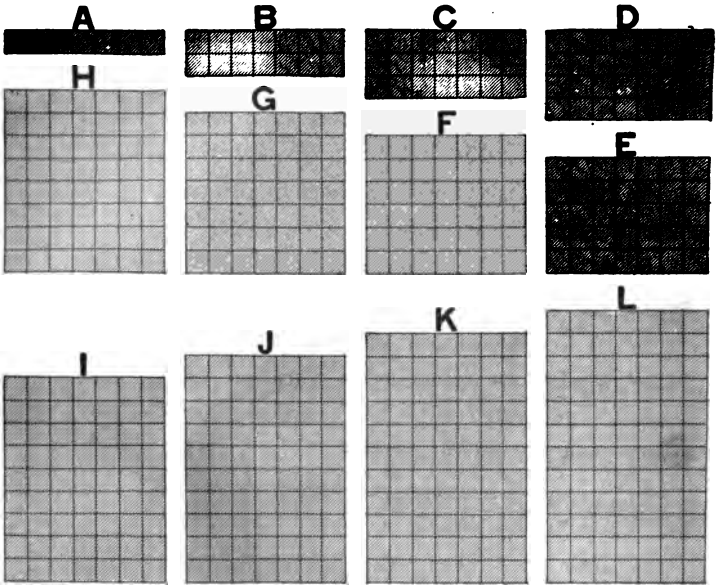
12. The Christmas holidays were two weeks long. How many days long were they?

13. Jennie paid 7¢ a pound for loaf sugar. How many pounds could she buy for 63 cents?

14. The summer vacation was 9 weeks long. How many days long was it?

15. George made a trip of 8 weeks. How many days was he away?

16. A term of school was 12 weeks long. How many school days were in it?



1. How many squares are there in A? How many rows of 7 squares each in B? How many such rows in C? In D? In E? In F? In G? In H? In I? In J?

2. A equals 7, B equals 14. How many in C? In D? In E? In F? In G? In H? In I? In J? In K? In L?

3. A equals what part of B? What part of C? Of D? Of E? Of F? Of G? Of H? Of I? Of J? Of K? Of L?

4. 7 equals what part of 14? What part of 21? Of 28? Of 35? Of 42? Of 49? Of 56? Of 63? Of 70? Of 77? Of 84?

5. B equals how many A's? What part of D? Of F? Of H? Of J? Of L?

6. 14 equals how many 7's? What part of 28? Of 42? Of 56? Of 70? Of 84?

7. C equals how many A's? What part of F? Of I?

1. 21 equals how many 7's? What part of 42? Of 63? Of 84?

2. D equals how many A's? How many B's? What part of H? Of L?

3. 28 equals how many 7's? How many 14's? What part of 56? Of 84?

4. E equals how many A's? What part of J?

5. 35 equals how many 7's? What part of 70?

6. F equals how many A's? How many B's? C's? What part of L?

7. 42 equals how many 7's? How many 14's? How many 21's? What part of 84?

8. 49 equals how many 7's?

TABLE OF SEVENS

$7\times1=7$	$7\times4=28$	$7\times7=49$	$7\times10=70$
$7\times2=14$	$7\times5=35$	$7\times8=56$	$7\times11=77$
$7\times3=21$	$7\times6=42$	$7\times9=63$	$7\times12=84$

2	12	22
32	**7**	42
52	62	72

3	13	23
33	**7**	43
53	63	73

4	14	24
34	**7**	44
54	64	74

5	15	25
35	**7**	45
55	65	75

6	16	26
36	**7**	46
56	66	76

7	17	27
37	**7**	47
57	67	77

8	18	28
38	**7**	48
58	68	78

9	19	29
39	**7**	49
59	69	79

9. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. In each problem add upward, then downward, then by lines to the right and left:

7	7	6	4	5	3	2
7	1	2	3	4	5	6
7	5	6	7	3	7	5
7	4	7	7	7	6	7
7	6	6	4	7	7	7
7	7	7	6	6	4	3
1	3	3	2	2	7	4

2. Add these numbers; subtract them; and multiply them:

14	28	56	21	42	84	35
7	7	7	7	7	7	7
83	75	94	67	77	89	48
7	7	7	7	7	7	7

3. Divide:

7)14	7)28	7)42	7)21	7)56	7)70
7)35	7)49	7)63	7)84	7)77	6)72

4. 28 equals how many 7's? 42 equals how many 7's?
56 equals how many 7's? 49 equals how many 7's?
35 equals how many 7's? 21 equals how many 7's?
63 equals how many 7's? 84 equals how many 7's?
14 equals how many 7's? 77 equals how many 7's?

5. 7 is $\frac{1}{3}$ of ..... 7 is $\frac{1}{5}$ of ..... 7 is $\frac{1}{2}$ of .....
7 is $\frac{1}{6}$ of ..... 7 is $\frac{1}{4}$ of ..... 7 is $\frac{1}{9}$ of .....
7 is $\frac{1}{8}$ of ..... 7 is $\frac{1}{7}$ of ..... 7 is $\frac{1}{10}$ of .....

1. How many 7's are there in 15? In 29?
How many 7's are there in 37? In 45?
How many 7's are there in 50? In 25?
How many 7's are there in 57? In 48?
How many 7's are there in 86? In 78?

2. A man bought 7 horses at $65 each. How much did he pay for them?

3. A train travels 252 miles in 7 hours. How far does it go in 1 hour if the speed is always the same?

4. If 7 yards of silk cost $8.75, what is the cost of 5 yards of the same?

5. In digging a well, 63 feet deep, 14 feet were dug through clay. If $\frac{1}{9}$ of the well was dug each day, how many days were spent in digging through the clay?

6. A gardener made a wire fence 14 yards long. He put posts 7 feet apart, and used 7 rows of wire. How many yards of wire did he use?

7. Read each line across the page and answer the questions. Then read each column from the top downward.

7×6, or $6\times 7=?$	$\frac{1}{7}$ of 42, or $42\div 7=?$	$\frac{1}{6}$ of 42, or $42\div 6=?$
7×10, or $10\times 7=?$	$\frac{1}{7}$ of 70, or $70\div 7=?$	$\frac{1}{10}$ of 70, or $70\div 10=?$
$7\times 7=?$	$\frac{1}{7}$ of 49, or $49\div 7=?$	.....
7×11, or $11\times 7=?$	$\frac{1}{7}$ of 77, or $77\div 7=?$	$\frac{1}{11}$ of 77, or $77\div 11=?$
7×2, or $2\times 7=?$	$\frac{1}{7}$ of 14, or $14\div 7=?$	$\frac{1}{2}$ of 14, or $14\div 2=?$
7×12, or $12\times 7=?$	$\frac{1}{7}$ of 84, or $84\div 7=?$	$\frac{1}{12}$ of 84, or $84\div 12=?$
7×8, or $8\times 7=?$	$\frac{1}{7}$ of 56, or $56\div 7=?$	$\frac{1}{8}$ of 56, or $56\div 8=?$
7×3, or $3\times 7=?$	$\frac{1}{7}$ of 21, or $21\div 7=?$	$\frac{1}{3}$ of 21, or $21\div 3=?$
7×5, or $5\times 7=?$	$\frac{1}{7}$ of 35, or $35\div 7=?$	$\frac{1}{5}$ of 35, or $35\div 5=?$
7×4, or $4\times 7=?$	$\frac{1}{7}$ of 28, or $28\div 7=?$	$\frac{1}{4}$ of 28, or $28\div 4=?$
7×9, or $9\times 7=?$	$\frac{1}{7}$ of 63, or $63\div 7=?$	$\frac{1}{9}$ of 63, or $63\div 9=?$
7×1, or $1\times 7=?$	$\frac{1}{7}$ of 7, or $7\div 7=?$	.....

Answer all you can orally.

1. Review pages 46 and 48 as oral work.

2. How many quarts are there in a peck?

3. Two pecks equal how many quarts?

4. A grocer bought a peck of gooseberries and sold half of them. How many quarts did he sell?

5. A woman picked a peck and a half of blackberries. How many quarts did she pick?

6. At 9¢ a quart, what will a peck of currants cost?

7. At 4¢ a quart, what will $1\frac{1}{2}$ pecks of seed beans cost?

8. How many pints in a quart? How many quarts in a gallon? How many pints in a gallon?

9. At 80¢ a gallon, what will one pint of ice-cream cost?

10. At 18¢ a pint, what will a gallon of whipping-cream cost?

11. At 96¢ a gallon, wholesale, what is the cost of a pint of varnish?

12. Find the cost of 8 quarts of milk, at 24¢ a gallon?

13. A party of 40 people were seated in equal numbers at 5 tables. How many were at each table?

14. Charlie earned 8¢ a day for 4 days, while Ben earned the same amount each day for 7 days. What was the difference of the earnings of the boys?

15. Mr. Brown has lived 8 times as long as his grandson, who is 10 years old. How old is Mr. Brown?

16. At 44¢ a gallon, what will be the cost of a 2-quart can of paint?

17. At 5¢ a pint, what will a gallon of Jersey milk cost?

18. A girl paid 56¢ for 8 yards of calico. What was the cost per yard?

19. If a family uses 6 pints of milk a day, how many pints will be used in 8 days?

1. It takes 8 yards of gingham to make a dress. How many dresses will 40 yards make?

2. If it takes 8 yards of gingham at 12 cents a yard for a dress, what does the cloth for the dress cost?

3. A girl earns 10 cents an hour. How much does she earn in a day of 8 hours?

4. A man works 8 hours a day, 6 days a week. How many hours a week does he work?

5. A man works from 8 o'clock in the morning until 5 o'clock in the afternoon, taking 1 hour for dinner. How many hours a day does he work?

6. At 8 dollars a month how much is the rent for a house for 1 year? For half a year?

7. A farmer mows 8 acres of meadow a day. How long will it take him to mow a 40-acre meadow?

8. If it takes for a winter 9 tons of coal at 8 dollars a ton, how much does the winter supply of coal cost?

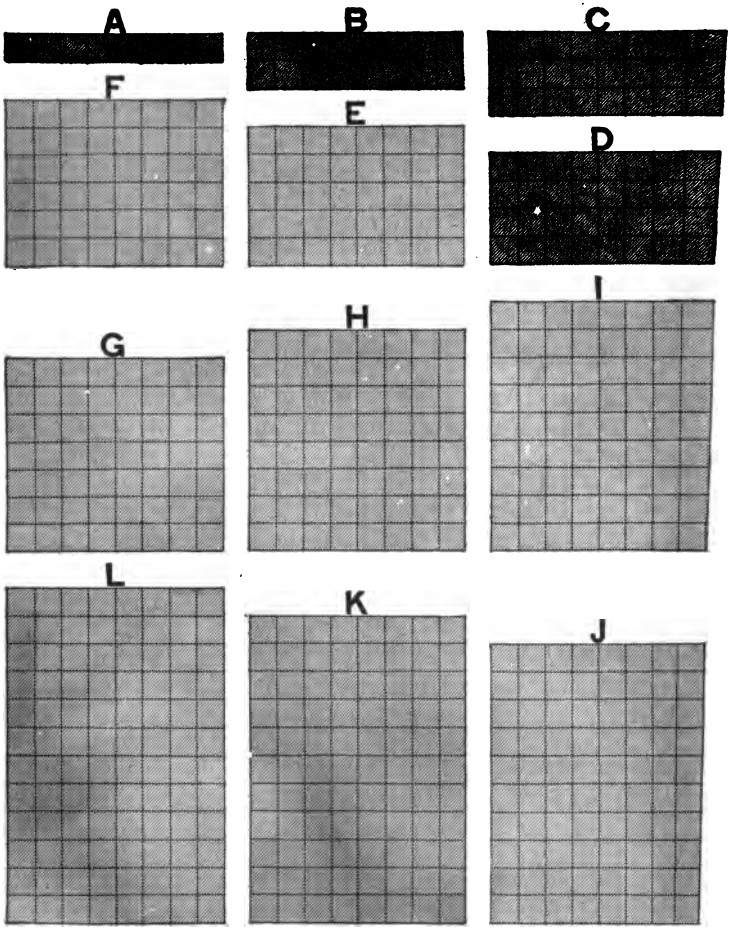
9. From the first of November to the first of April a family uses 2 tons of coal a month and pays 8 dollars a ton for it. How much does this coal cost?

10. A bicycle rider rides 8 miles an hour, 10 hours a day. How far does he ride in 3 days?

11. A grocer buys cranberries at 64 cents a peck and sells them at 10 cents a quart. How much a peck does he make?

12. There are 2 grass plots in front of a house, and each is 8 feet wide and 10 feet long. How many square feet are there in both plots?

13. A window has 8 panes of glass, each pane having 1 square foot of surface letting in light. How many square feet, that let in light, has the whole window? How many square feet, that let in light, have 8 such windows?



1. How many squares are there in A? How many rows of 8 squares each in B? How many such rows in C? In D? In E? In F? In G? In H? In I?

2. A equals 8, B equals 16. How many does C equal? D? E? F? G? H? I? J? K? L?

1. 8 equals what part of 16? What part of 24? Of 32? Of 40? Of 48? Of 56? Of 64? Of 72? Of 80? Of 88?

2. 16 equals how many 8's? What part of 32? Of 48? Of 64? Of 80? Of 96?

3. 24 equals how many 8's? What part of 48? Of 72? Of 96?

4. 32 equals how many 8's? How many 16's? What part of 64? Of 96?

5. 40 equals how many 8's? What part of 80?

6. 48 equals how many 8's? How many 16's? How many 24's? What part of 96?

7. 56 equals how many 8's?

8. 64 equals how many 8's? 16's? 32's?

TABLE OF EIGHTS

$8\times1=8$	$8\times4=32$	$8\times7=56$	$8\times10=80$
$8\times2=16$	$8\times5=40$	$8\times8=64$	$8\times11=88$
$8\times3=24$	$8\times6=48$	$8\times9=72$	$8\times12=96$

2	12	22
32	**8**	42
52	62	72

3	13	23
33	**8**	43
53	63	73

4	14	24
34	**8**	44
54	64	74

5	15	25
35	**8**	45
55	65	75

6	16	26
36	**8**	46
56	66	76

7	17	27
37	**8**	47
57	67	77

8	18	28
38	**8**	48
58	68	78

9	19	29
39	**8**	49
59	69	79

9. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. In each problem add upward, then downward, then by lines to the right and left:

8	8	8	8	8	8	8	8
8	7	8	6	5	8	1	7
8	6	7	4	8	6	2	7
8	5	8	2	8	5	3	6
8	2	8	8	7	8	6	4
7	1	6	8	6	8	7	3

2. Add these numbers; subtract them; and multiply them:

32	24	16	48	56	72	64	40
8	8	8	8	8	8	8	8
13	25	37	49	88	67	386	497
8	8	8	8	8	8	8	8

3. Divide:

8)16	8)32	8)48	8)24	8)56	8)72
8)40	8)64	8)88	8)96	8)80	7)84

4. 16 equals how many 8's? 48 equals how many 8's?
32 equals how many 8's? 64 equals how many 8's?
40 equals how many 8's? 24 equals how many 8's?
56 equals how many 8's? 72 equals how many 8's?
88 equals how many 8's? 49 equals how many 7's?

5. 8 is $\frac{1}{3}$ of ..... 8 is $\frac{1}{5}$ of .....
8 is $\frac{1}{2}$ of ..... 8 is $\frac{1}{6}$ of .....
8 is $\frac{1}{4}$ of ..... 8 is $\frac{1}{8}$ of .....
8 is $\frac{1}{9}$ of ..... 8 is $\frac{1}{7}$ of .....
8 is $\frac{1}{10}$ of ..... 8 is $\frac{1}{12}$ of .....

1. How many 8's are there in 17? In 34?
How many 8's are there in 47? In 27?
How many 8's are there in 56? In 63?
How many 8's are there in 59? In 67?

2. A boy picked 38 quarts of berries in one week, 42 in the second, 28 in the third, and 18 in the fourth. How many quarts did he pick? How many pecks?

3. A man traveled 284 miles by rail and 8 times as far by steamer. How far did he travel by steamer?

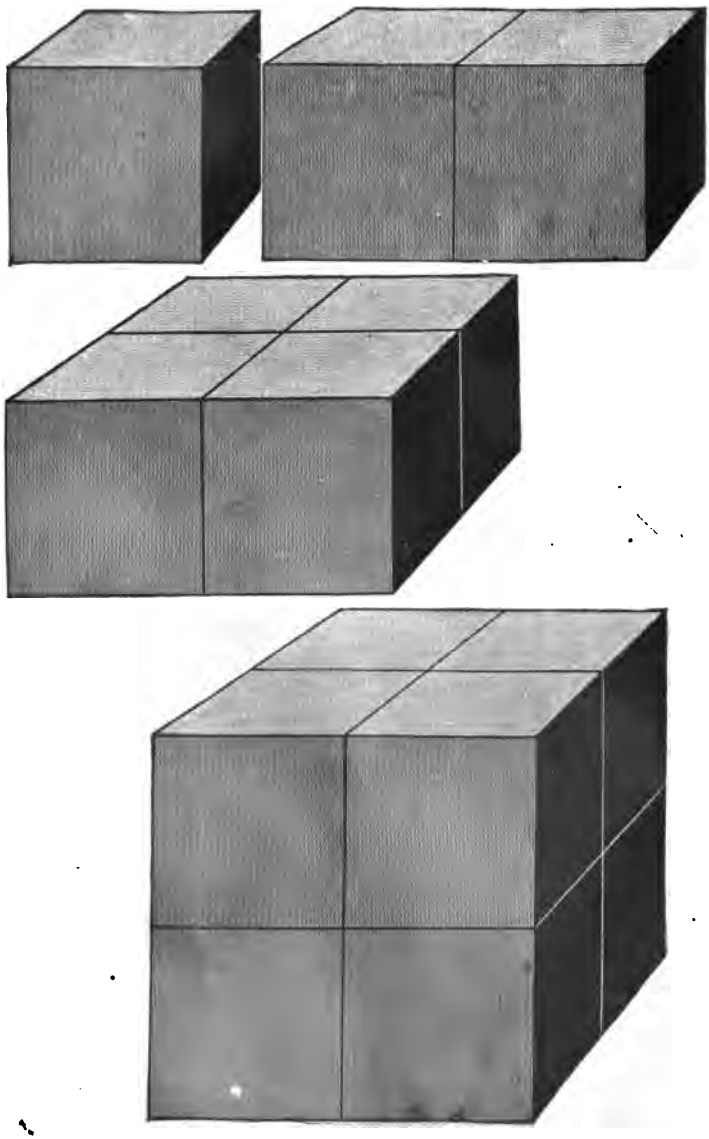
4. During the summer a family used 248 quarts of milk. During the winter they used $\frac{1}{8}$ more than that. How many quarts did they use during the winter?

5. In an orchard there are 56 trees in each row, and $\frac{1}{7}$ as many rows as there are trees in a row. How many rows are there? How many trees in all?

6. If 32 bushels of wheat make 8 barrels of flour; how many bushels will be needed to make 64 barrels of flour?

7. Read each line across the page and answer the questions. Then read each column from the top downward.

8×3, or $3\times 8=?$	$\frac{1}{8}$ of 24, or $24\div 8=?$	$\frac{1}{3}$ of 24, or $24\div 3=?$
8×7, or $7\times 8=?$	$\frac{1}{8}$ of 56, or $56\div 8=?$	$\frac{1}{7}$ of 56, or $56\div 7=?$
8×4, or $4\times 8=?$	$\frac{1}{8}$ of 32, or $32\div 8=?$	$\frac{1}{4}$ of 32, or $32\div 4=?$
8×5, or $5\times 8=?$	$\frac{1}{8}$ of 40, or $40\div 8=?$	$\frac{1}{5}$ of 40, or $40\div 5=?$
8×2, or $2\times 8=?$	$\frac{1}{8}$ of 16, or $16\div 8=?$	$\frac{1}{2}$ of 16, or $16\div 2=?$
8×6, or $6\times 8=?$	$\frac{1}{8}$ of 48, or $48\div 8=?$	$\frac{1}{6}$ of 48, or $48\div 6=?$
8×9, or $9\times 8=?$	$\frac{1}{8}$ of 72, or $72\div 8=?$	$\frac{1}{9}$ of 72, or $72\div 9=?$
8×11, or $11\times 8=?$	$\frac{1}{8}$ of 88, or $88\div 8=?$	$\frac{1}{11}$ of 88, or $88\div 11=?$
8×10, or $10\times 8=?$	$\frac{1}{8}$ of 80, or $80\div 8=?$	$\frac{1}{10}$ of 80, or $80\div 10=?$
$8\times 8=?$	$\frac{1}{8}$ of 64, or $64\div 8=?$	.....
8×12, or $12\times 8=?$	$\frac{1}{8}$ of 96, or $96\div 8=?$	$\frac{1}{12}$ of 96, or $96\div 12=?$
8×1, or $1\times 8=?$	$\frac{1}{8}$ of 8, or $8\div 8=?$	.....



1. Place two one-inch cubes in a row. Place another row of two one-inch cubes in front of the first row. How many rows of one-inch cubes are there?

2. How many one-inch cubes, or cubic inches, are there in a row? How many are there in both rows?

3. Place four more one-inch cubes in a layer on top of these cubes. How many layers of cubes are there?

4. How many cubic inches are there in a layer? How many are there in both layers?

5. Find a two-inch cube on page **104.**

6. Build a two-inch cube with the one-inch cubes.

7. How many layers of one-inch cubes are there in the two-inch cube?

8. How many rows are there in each layer?

9. How many one-inch cubes are there in each row?

10. How many one-inch cubes are there in both rows?

11. How many one-inch cubes are there in both layers?

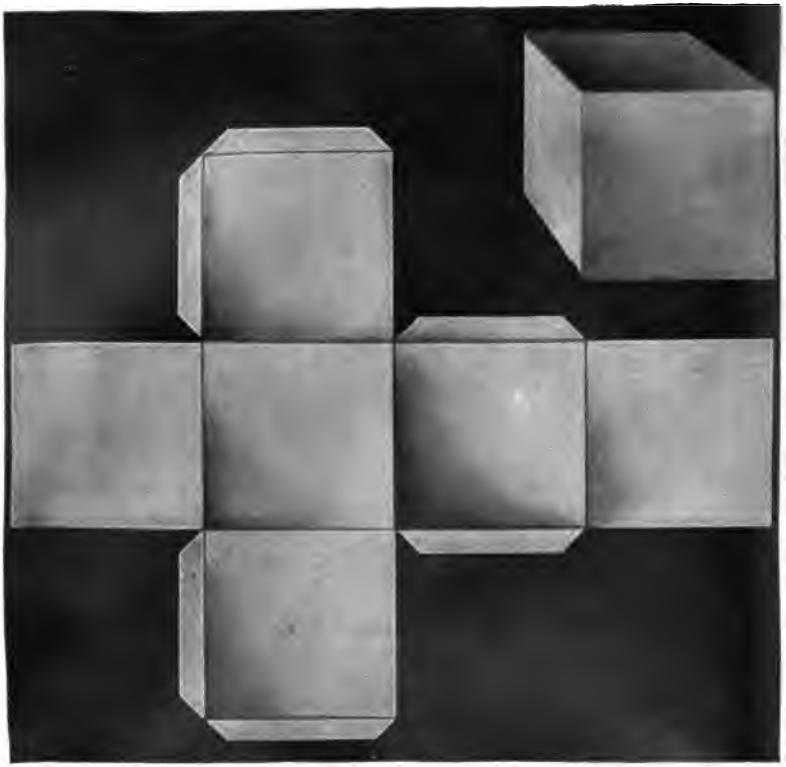
12. Take away one layer of cubes. How many one-inch cubes are taken? What part of the two-inch cube is taken?

13. Take away one row from the remaining layer. What part of the layer is taken? What part of the two-inch cube is taken?

14. Take away a one-inch cube from the remaining row. What part of the row is taken? What part of the layer is taken? What part of the two-inch cube?

15. A one-inch cube is what part of a two-inch cube? Two one-inch cubes are what part? Three one-inch cubes are what part? Four are what part? Five?

16. How many 1-inch cubes in $\frac{1}{2}$ of a 2-inch cube? In $\frac{1}{4}$ of a 2-inch cube? In $\frac{1}{8}$ of a 2-inch cube?



1. A cube has how many faces? What is the shape of each?

2. Draw the pattern of an inch cube, as shown in the picture. Cut it from the paper, fold on the lines, and paste the laps on the inside.

3. How many edges has a cube? How many corners?

4. Draw a pattern and make a 2-inch cube.

5. In a 3-inch cube there are how many one-inch cubes?

6. Without thinking of the laps, how many square inches of paper did you use in making the one-inch cube? The 2-inch cube?

1. Build with cubes a solid containing two rows of 3 cubic inches each.

2. What is the length? The height? The other dimension, or width?

3. Build a solid containing two layers of two rows of 3 cubic inches.

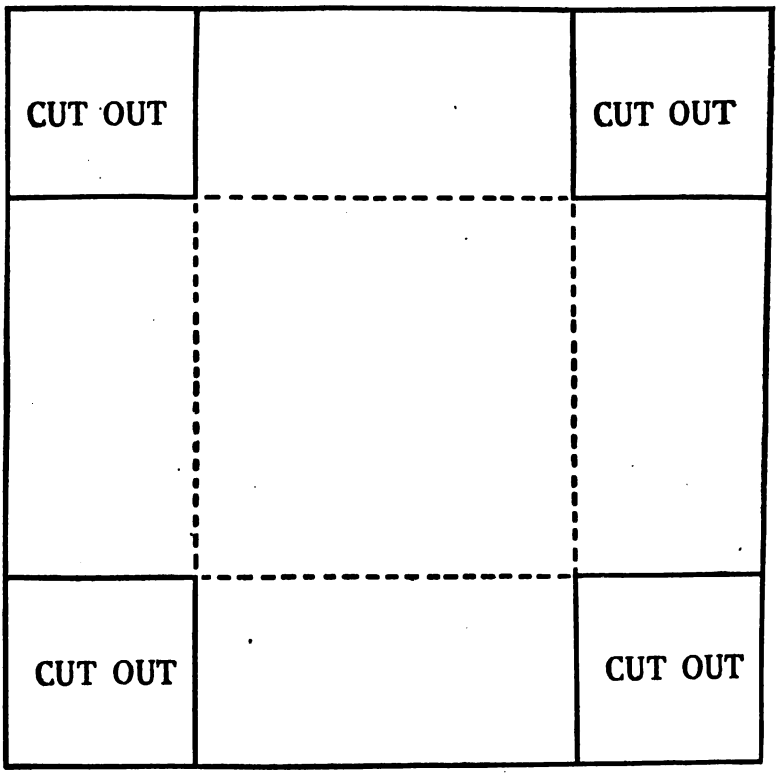
4. What is the width? The height? The other dimension, or length?

5. Build the following solids, tell their dimensions, and the number of cubic inches in each:

One layer of two rows of 3 cubic inches.
Two layers of two rows of 3 cubic inches.
One layer of two rows of 4 cubic inches.
Two layers of two rows of 4 cubic inches.
One layer of three rows of 5 cubic inches.
Two layers of two rows of 5 cubic inches.
Two layers of two rows of 8 cubic inches.
Two layers of two rows of 7 cubic inches.
Four layers of two rows of 4 cubic inches.
Two layers of two rows of 6 cubic inches.
Two layers of three rows of 3 cubic inches.
Four layers of two rows of 5 cubic inches.
Three layers of two rows of 4 cubic inches.
One layer of three rows of 8 cubic inches.
Two layers of two rows of 9 cubic inches.
One layer of two rows of 12 cubic inches.
Two layers of two rows of 12 cubic inches.

6. Give the dimensions of one solid containing:

8 cubic inches;	12 cubic inches;
6 cubic inches;	10 cubic inches;
9 cubic inches;	16 cubic inches.



1. To make a box that will hold 4 cubic inches, draw a figure like this one. Cut out the corners, fold on dotted lines, and paste the square pieces cut from the corners over the joinings.

2. Make a box of paper, cardboard, or wood that will hold, when full:

5 cubic inches;	10 cubic inches;
6 cubic inches;	12 cubic inches;
8 cubic inches;	16 cubic inches;
9 cubic inches;	18 cubic inches.

1. A box is 3 inches long, 2 inches wide, and 2 inches high. How many cubic inches will it hold?

2. How wide is a box that contains eight cubic inches, and is two inches high and two inches long?

3. How long is a box that contains sixteen cubic inches, and is two inches wide and two inches high?

4. How high is a box that contains twelve cubic inches, and is two inches long and two inches wide?

5. A brick six inches long and four inches wide contains forty-eight cubic inches. How thick is it?

6. A bin is four feet long, two feet wide, and four feet high. How many cubic feet does it contain?

7. In a block of marble there are sixteen cubic feet. It is four feet long and two feet wide. How thick is it?

8. How many cubic feet of air are there in a glass case that is five feet high, two feet wide, and two feet long?

9. How many cubic yards of air are there in a room that is 3 yards long, 2 yards wide, and 3 yards high?

10. A ditch is four feet wide and three feet deep. How many cubic feet are there in a part two feet long? How many in a part three feet long?

11. How many cubic feet of space are there in a wagon box that is 9 feet long, 4 feet wide, and 2 feet high?

12. How many cubic feet are there in a pile of wood four feet long, two feet wide, and two feet high?

13. How many cubic inches are there in a box 1 foot long, 4 inches wide, and 2 inches deep?

14. How many cubic feet in a play-house that is 5 feet long, 5 feet wide, and 5 feet high? In one that is 3 feet by 3 feet by 5 feet? How many cubic feet in the two houses together?

Answer all you can orally.

1. Review page 44 as oral work.

2. In a 5-gallon can, how many quarts are there? How many pints? How many gills?

3. A milk-man started in the morning with 100 quarts of milk. How many pints did he have? How many gallons?

4. There are 8 people in a family and each one drinks $\frac{1}{2}$ a pint of milk. How many pints do they drink? How many quarts?

5. From a jar containing 2 gallons of mineral water, 6 pints were taken. How many pints were left? How many quarts?

6. How many bottles holding 2 quarts each can be filled from 20 gallons?

7. A lamp burns a quart of oil every 24 hours. How many quarts are used in 32 days? How many gallons?

8. A milk-man had 176 quarts of milk. How many gallons did he have?

9. How many gill cups can be filled from 2 quarts and 1 pint of vinegar? From 5 gallons?

10. There are $31\frac{1}{2}$ gallons in a barrel. How many gallons are there in 4 barrels? In 6 barrels? In 8 barrels? 3 barrels? 5 barrels?

11. How many quarts are there in a barrel?

12. From a barrel of gasoline how many cans may be filled if each holds 3 quarts? How many if each holds $\frac{1}{2}$ a gallon? $1\frac{1}{2}$ gallons?

13. A milk-man starts in the morning with 48 gallons of milk. How many customers can he serve if each takes 3 quarts? How many, if each takes 2 quarts? If each takes 3 pints?

1. Review page 46 as oral work.

2. What is 1 quart of beans worth if a peck is worth 72¢?

3. At $2 a peck, how many bushels of clover seed can be bought for $88?

4. A fruit dealer sold 3 pecks of nuts at 8¢ a quart. How much did he receive for them?

5. A farmer picked 2 bushels of apples from one tree and 3 bushels from another. How many pecks did he pick from both together?

6. A grain bin holds 2 bushels. How many pecks do 7 such bins hold?

7. A boy picked 64 quarts of berries. How many pecks did he pick? How many bushels?

8. From a bushel of beans 2 quarts and 1 pint are taken. How many quarts are left?

9. How many pint boxes of cherries may be filled from a peck?

10. A man paid 60¢ for $1\frac{1}{2}$ bushels of apples. He sold them at 15¢ a peck. How much did he receive? How much did he gain?

11. 2 boys gathered 6 bushels of nuts. They sold $5\frac{1}{2}$ bushels by the peck. How many pecks did they sell? The remainder they sold by the quart. How many quarts did they sell?

12. A wheat bin holds 144 bushels. If 340 pecks are taken out, how many pecks remain? How many bushels?

13. A farmer gathers from his apple orchard 5 bushels per tree. There are 75 trees. How many bushels does he gather? If he packs them in barrels, 3 bushels to a barrel, how many barrels does he need? At $3 a barrel, how much will he receive for them?

1. How long will it take to travel 592 miles on a bicycle at the rate of 8 miles an hour?

2. A squirrel carried into a hollow tree 8 acorns every day. How many did he carry into the tree in 8 weeks?

3. Find the cost of 2 bushels of cherries at 4¢ a pint.

4. What is the weight of 8 tubs of butter, each weighing $56\frac{1}{2}$ pounds?

5. What is the cost of 3 pecks, 3 quarts of peas at 8¢ a quart?

6. What is the cost of 8 sacks of barley, each weighing 112 pounds, at 8¢ a pound?

7. How many pints in 536 gallons? In 987 gallons?

8. How many quarts in 498 pecks? In 789 pecks? In 586 pecks? In 379 pecks?

9. How many months will it take a man to save $1000, if he saves $8 a month?

10. How many pecks in 2768 quarts? In 7912 quarts?

11. How many gallons in 4584 pints? In 9728 pints?

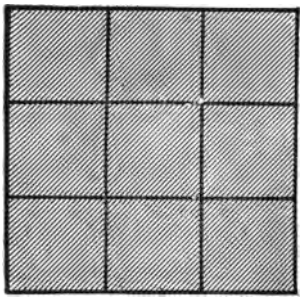
12. How long will a barrel of oil containing 504 pints last, if 8 pints are burned each week?

13. Find the weight of 8 barrels of oat meal, each containing 192 pounds.

14. A fruit-dealer bought 8 barrels of apples at $2 a barrel, each barrel containing 3 bushels. He sold them at $1 a bushel. How much did he get for them? How much did he gain?

15. Allowing 30 days to a month, how many days are there in 8 months?

16. A farmer had 420 bushels of wheat. He sold $\frac{1}{3}$ of it to one man and 304 pecks to another. How many bushels had he left?



1. Let $\frac{1}{2}$ inch in this figure stand for one foot. How long and wide is the square the whole figure stands for? How many square feet in it?

2. How many square feet in two such squares? How many square yards?

3. How many square yards in 27 square feet?

4. How many square feet in 4 square yards? In 5? In 6? In 7? In 8? In 9? In 10? In 11? In 12?

5. How many square yards in a window 3 feet wide and 6 feet high?

6. How many square feet of plate glass are there in a store window 6×9 feet?

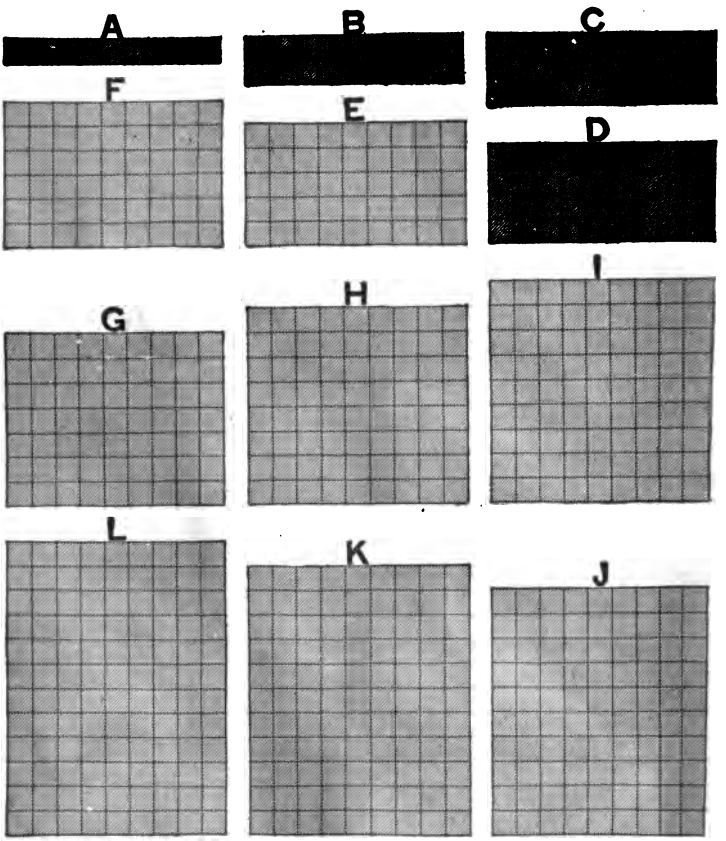
7. How many dresses of 9 yards each, can Alice have made from 27 yards of cloth?

8. A hotel bought 9 gallons of milk a day. How many gallons were bought in a week? In 3 weeks? In 4 weeks? In 8 weeks?

9. At 10¢ a box, how many boxes of strawberries can be bought for 90¢?

10. A woman charged 9¢ an hour for sweeping offices. She worked from 7 o'clock in the morning until 5 in the evening, with an hour out for lunch. How much did she earn a day? In a week of working days? In 6 weeks?

11. A room is 18 feet wide, 24 feet long, and 12 feet high. How many square yards are there in the ceiling? In the floor? In the end-walls? In the side-walls? How many square yards of surface in all the walls and in the ceiling?



1. How many squares are there in A? How many rows of 9 squares each in B? How many such rows in C? In D? In E? In F? In G? In H? In I?

2. A equals 9. B equals 18. How many does C equal? D? E? F? G? H? I? J? K? L?

3. 9 equals what part of 18? What part of 27? Of 36? Of 45? Of 54? Of 63? Of 72? Of 81? Of 90? Of 99? Of 108?

1. 18 equals how many 9's? What part of 36? Of 54? Of 72? Of 90? Of 108?

2. 27 equals how many 9's? What part of 81? Of 108?

3. 36 equals how many 9's? How many 18's? What part of 72? Of 108?

4. 45 equals how many 9's? What part of 90?

5. 54 equals how many 9's? How many 18's? How many 27's? What part of 108?

6. 63 equals how many 9's?

7. 72 equals how many 9's? How many 18's?

8. 81 equals how many 9's? How many 27's?

TABLE OF NINES

$9\times1=9$	$9\times4=36$	$9\times7=63$	$9\times10=90$
$9\times2=18$	$9\times5=45$	$9\times8=72$	$9\times11=99$
$9\times3=27$	$9\times6=54$	$9\times9=81$	$9\times12=108$

2	12	22
32	**9**	42
52	62	72

3	13	23
33	**9**	43
53	63	73

4	14	24
34	**9**	44
54	64	74

5	15	25
35	**9**	45
55	65	75

6	16	26
36	**9**	46
56	66	76

7	17	27
37	**9**	47
57	67	77

8	18	28
38	**9**	48
58	68	78

9	19	29
39	**9**	49
59	69	79

9. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. In each problem add upward, then downward, then by lines across the page:

9	9	9	9	9	9	9	9
8	9	7	6	9	4	3	2
7	8	9	6	5	9	9	8
6	9	7	9	9	4	3	9
5	8	9	6	9	9	9	2
4	9	7	9	5	9	3	9
3	8	9	6	9	4	9	2
2	9	7	9	5	9	3	9
1	8	9	6	9	4	9	2

2. Add these numbers; subtract them, and multiply them:

47	68	45	89	93	77	90	64
9	9	9	9	9	9	9	9
39	88	92	46	80	209	398	768
9	9	9	9	9	9	9	9

3. Divide:

9)27	9)45	9)63	9)36	9)54	9)18
9)72	9)108	9)90	9)81	9)99	8)96

4. 27 equals how many 9's? 45 equals how many 9's?
54 equals how many 9's? 36 equals how many 9's?
63 equals how many 9's? 81 equals how many 9's?
18 equals how many 9's? 90 equals how many 9's?
72 equals how many 9's? 108 equals how many 9's?
99 equals how many 9's? 72 equals how many 8's?

1. Read the following, filling the blanks:

9 is $\frac{1}{4}$ of	9 is $\frac{1}{10}$ of	9 is $\frac{1}{3}$ of .....
9 is $\frac{1}{2}$ of	9 is $\frac{1}{11}$ of	9 is $\frac{1}{7}$ of .....
9 is $\frac{1}{8}$ of	9 is $\frac{1}{6}$ of	8 is $\frac{1}{12}$ of .....
9 is $\frac{1}{9}$ of	9 is $\frac{1}{5}$ of	8 is $\frac{1}{7}$ of .....

2. How many 9's in 19? In 29?
How many 9's in 48? In 56?
How many 9's in 39? In 65?
How many 9's in 76? In 109?
How many 9's in 84? In 98?
How many 9's in 36? In 74?

3. At sight, name the sums:

5	6	7	8	9	4	8	7	7
4	7	8	9	3	9	6	7	9
5	6	9	8	7	6	5	7	4
3	7	5	6	8	9	4	6	9
2	3	4	4	6	5	6	9	8
10	41	22	53	84	75	36	67	98
6	6	6	6	6	6	6	6	6

4. At sight, name the differences:

12	15	18	17	19	16	29	25	28
4	6	4	6	5	4	9	3	7
24	26	28	26	27	25	23	28	27
13	12	15	14	16	14	11	15	13
21	22	23	24	25	27	28	26	25
9	6	7	8	6	9	8	9	7

1. What is the cost of 6 feet of molding, if 9 feet cost 81 cents?

2. In the front of a building there are 72 windows. In each story there are 9 windows. How many stories high is the building?

3. Jane's grandfather is 72 years of age, and Jane is one-ninth as old. In how many years will she be 17?

4. How much more than $36 should a man have in order to buy 9 tons of coal at $5 a ton?

5. Find the cost of 17 barrels of rice at $9 a barrel.

6. I had 9 dozen buttons and used 88 buttons. How many were left? How much did I pay for all of them at 6¢ a dozen?

7. A steamer sails 298 miles a day. How far will it sail in 9 days?

8. I bought 12 barrels of flour at $9 a barrel, and sold the flour for $95. How much did I lose?

9. Alice has $11 and her father has 9 times as much and $8 more. How many dollars have both?

10. A certain line of telegraph costs $985 a mile. How much would 9 miles cost?

11. What is a man's income in 9 years at $2385 a year?

12. A gentleman earns $9 a day for 8 days, and spends $8 a day for 8 days. How much has he left?

13. There are 322 rails to the mile of railroad track. How many rails in 9 miles of track?

14. There are 9 equal lots fronting on a street 378 feet long. How wide is each lot?

15. A boy takes 9 subscriptions to the Youth's Companion at $1.75 each. How much money does he receive for them all?

1. How many square feet in a square yard?

2. A blackboard is 4 feet wide and 9 feet long. How many square feet in it? How many square yards?

3. Each window in a building contains 9 square feet. In 6 such windows there are how many square feet? How many square yards?

4. One end of a desk is 9 feet from the wall, the other end is 7 feet from the opposite wall. The desk is 3 feet and 6 inches long. How far is it from one side of the room to the other?

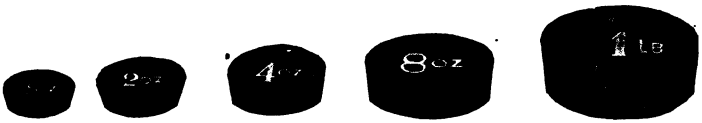
5. John has 83¢. How many 9¢ books can he buy, and how much money will he have left?

6. A boy pays 12¢ for 3 pencils. At the same rate what will 79 pencils cost?

7. In each of 9 cars there are 57 persons. How many persons in the 9 cars?

8. Read each line across the page and answer the questions. Then read the columns from the top downward.

9×5, or $5\times 9=?$	$\frac{1}{9}$ of 45, or $45\div 9=?$	$\frac{1}{5}$ of 45, or $45\div 5=?$
9×4, or $4\times 9=?$	$\frac{1}{9}$ of 36, or $36\div 9=?$	$\frac{1}{4}$ of 36, or $36\div 4=?$
9×6, or $6\times 9=?$	$\frac{1}{9}$ of 54, or $54\div 9=?$	$\frac{1}{6}$ of 54, or $54\div 6=?$
9×10, or $10\times 9=?$	$\frac{1}{9}$ of 90, or $90\div 9=?$	$\frac{1}{10}$ of 90, or $90\div 10=?$
9×3, or $3\times 9=?$	$\frac{1}{9}$ of 27, or $27\div 9=?$	$\frac{1}{3}$ of 27, or $27\div 3=?$
9×7, or $7\times 9=?$	$\frac{1}{9}$ of 63, or $63\div 9=?$	$\frac{1}{7}$ of 63, or $63\div 7=?$
9×11, or $11\times 9=?$	$\frac{1}{9}$ of 99, or $99\div 9=?$	$\frac{1}{11}$ of 99, or $99\div 11=?$
9×2, or $2\times 9=?$	$\frac{1}{9}$ of 18, or $18\div 9=?$	$\frac{1}{2}$ of 18, or $18\div 2=?$
9×8, or $8\times 9=?$	$\frac{1}{9}$ of 72, or $72\div 9=?$	$\frac{1}{8}$ of 72, or $72\div 8=?$
9×12, or $12\times 9=?$	$\frac{1}{9}$ of 108, or $108\div 9=?$	$\frac{1}{12}$ of 108, or $108\div 12=?$
$9\times 9=?$	$\frac{1}{9}$ of 81, or $81\div 9=?$	.....
9×1, or $1\times 9=?$	$\frac{1}{9}$ of 9, or $9\div 9=?$	.....



Answer all you can orally.

1. Review page 50 as oral work.

2. How many ounces are there in 1 pound? In 2 pounds? In 3 pounds? In 4 pounds? In 6 pounds?

3. What part of 1 pound is 8 ounces? 4 ounces? 2 ounces? 12 ounces?

4. Which weight shown on this page equals $\frac{1}{2}$ a pound? Which one equals $\frac{1}{16}$ of a pound? Which, $\frac{1}{4}$ of a pound?

5. Which 2 weights together equal $\frac{3}{4}$ of a pound? Which 2 together equal $\frac{3}{8}$ of a pound?

6. The 8-ounce weight equals what part of 2 pounds? Of 3 pounds? Of 6 pounds?

7. The 4-ounce weight equals what part of 2 pounds? Of 3 pounds?

8. The 8-ounce and the 4-ounce weight together equal what part of 3 pounds? Of 6 pounds?

9. How many pounds in a hundredweight?

10. How many hundredweights are there in 200 pounds? In 400 pounds?

11. How many pounds are there in $\frac{1}{2}$ of a hundredweight? In $\frac{1}{4}$ of a hundredweight?

12. If a grocer has different weights, as shown in the picture, which ones may he use in weighing $\frac{3}{4}$ of a pound of tea? Which, in weighing $\frac{3}{8}$ of a pound? $\frac{9}{16}$ of a pound? $\frac{3}{16}$? $\frac{1}{2}$? $\frac{5}{16}$? $\frac{1}{8}$? $\frac{1}{4}$? $\frac{1}{16}$? $\frac{11}{16}$? $\frac{7}{8}$?

13. Which different weights may he use in weighing $1\frac{1}{4}$ pounds of rice? In weighing $1\frac{7}{8}$ pounds? $1\frac{1}{8}$ pounds? $1\frac{1}{2}$ pounds? $1\frac{3}{4}$ pounds?

1. There are 60 pounds of wheat in 1 bushel. How many pounds in 9 bushels? In 7 bushels?

2. One hundredweight of metal costs $6. What will 50 pounds cost? 75 pounds? 25 pounds?

3. What is the postage at 1¢ for 2 ounces on a package weighing 4 ounces? On $1\frac{1}{2}$ pounds? On 3 pounds?

4. A bushel of oats weighs 32 pounds. How many pounds in a peck? In a quart? In 3 pecks?

5. A grocer weighs out $1\frac{1}{2}$ pounds of butter. What weights may he use? How many 4-ounce weights will he use to weigh $1\frac{1}{4}$ pounds? $\frac{3}{4}$ of a pound? 2 pounds?

6. A grocer sells 8 packages of tea, each weighing 6 ounces. How many ounces do all weigh together? How many pounds?

7. A man bought 60 bags of flour, each weighing 5 pounds. How many hundredweights did he buy?

8. If a man buys old iron at $1\frac{1}{2}$¢ a pound, what will he pay for 24 pounds? For $\frac{1}{2}$ a hundredweight?

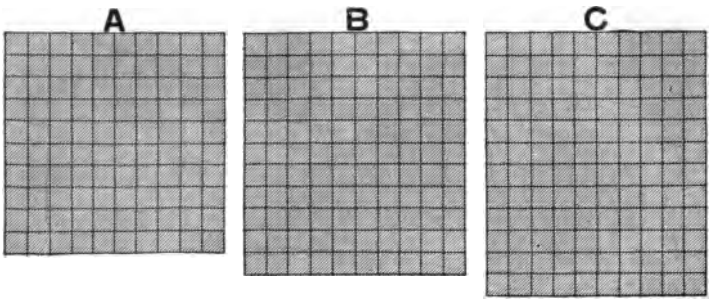
9. How many ounces are there in 9 pounds?

10. A farmer sold 6 tubs of butter averaging in weight $\frac{1}{2}$ a hundredweight each. How many pounds did he sell? How many ounces?

11. What is the weight in pounds of 3 packages, one weighing $2\frac{1}{2}$ pounds, one $\frac{1}{2}$ a pound and the other 3 pounds? What is the weight in ounces?

12. A man bought 3 packages of beans weighing 8 pounds each. He made them into 8-ounce packages. How many packages did he have?

13. A grocer sold $\frac{1}{8}$ of a pound of tea, $\frac{1}{2}$ a pound of butter, $\frac{3}{4}$ of a pound of coffee, and $1\frac{1}{2}$ pounds of sugar. How many ounces were there in the entire sale?



1. How many squares are there in one row of A? How many rows of 10 squares each in A? In B? In C?

2. How many 10's in 100? In 110? In 120?

3. 10 is what part of 20? Of 30? Of 40? Of 50? Of 60? Of 70? Of 80? Of 90? Of 100? Of 110? Of 120?

4. 20 equals how many 10's? What part of 40? Of 60? Of 80? Of 100? Of 120?

5. 30 equals how many 10's? What part of 60? Of 90? Of 120?

6. 40 equals how many 10's? 20's? What part of 80? Of 120?

7. 50 equals how many 10's? What part of 100?

8. 60 equals how many 10's? 20's? How many 30's? What part of 120?

9. 70 equals how many 10's?

10. 80 equals how many 10's? 20's? How many 40's?

11. 90 equals how many 10's? How many 30's?

12. 100 equals how many 10's? 20's? How many 50's?

13. 110 equals how many 10's? 120 equals how many 10's? 20's? How many 30's? 40's? 60's?

14. Name all the numbers to 120 that can be exactly divided by 10.

TABLE OF TENS

$10\times1=10$	$10\times4=40$	$10\times7=70$	$10\times10=100$
$10\times2=20$	$10\times5=50$	$10\times8=80$	$10\times11=110$
$10\times3=30$	$10\times6=60$	$10\times9=90$	$10\times12=120$

1. Add these numbers; subtract them; and multiply them:

12	15	23	30	36	42	47	53	59	61
10	10	10	10	10	10	10	10	10	10
74	79	80	83	88	91	98	87	58	67
10	10	10	10	10	10	10	10	10	10

2. Divide:

$10\overline{)30}$	$10\overline{)50}$	$10\overline{)46}$	$10\overline{)60}$	$10\overline{)75}$	$10\overline{)29}$
$10\overline{)67}$	$10\overline{)90}$	$10\overline{)38}$	$10\overline{)100}$	$10\overline{)99}$	$10\overline{)110}$
$4\overline{)40}$	$5\overline{)50}$	$9\overline{)90}$	$10\overline{)76}$	$12\overline{)120}$	$11\overline{)110}$

2	12	22
32	**10**	42
52	62	72

3	13	23
33	**10**	43
53	63	73

4	14	24
34	**10**	44
54	64	74

5	15	25
35	**10**	45
55	65	75

6	16	26
36	**10**	46
56	66	76

7	17	27
37	**10**	47
57	67	77

8	18	28
38	**10**	48
58	68	78

9	19	29
39	**10**	49
59	69	79

3. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. Review page 52 as oral work.

2. Write one dollar as it is written in business.

3. In the same way write 2 dollars; 3 dollars; 5 dollars.

4. Write 50 cents in all the ways you can.

5. Write $1 and 50 cents, without using the word "cents."

6. Write 2 dollars and twenty-five cents; 7 dollars and 10 cents; ten dollars and 75 cents; twelve dollars and fifteen cents.

7. Write $1 and 5 cents. Where is the 5 written? Why? In what way is the first column to the right of the point to be filled?

8. Write $8 and 9 cents; $3 and 1 cent; $17 and 6 cents.

9. When there are no cents how is the cents' column to be filled? Write $1, five dimes, and 1 cent. Read it.

10. Write $1 and 25 cents. Take away the dollar. What is left?

11. Write 25 cents as in problem 10. Write 17 cents; seventy-five cents; 4 cents; 40 cents.

12. Read:

$5.01	$9.10	$7.09	$10.20	$36.50	$30.03
$8.02	$4.15	$9.13	$43.75	$84.62	$13.40

13. Read, $.40, $.16, $.35, $.50, $.07, $.10, $.09.

14. Write in figures:

Nine dollars and twenty-five cents; forty dollars.
Twenty-six dollars and six cents; fourteen cents.
Ninety dollars and ninety cents; seven cents.
Thirty dollars and five cents; one hundred dollars.
Seventy-five dollars and seventy-five cents.
Eighty dollars and 9 cents.
Sixty-one dollars and 1 cent.

Answer all you can orally.

1. If a man works 10 hours a day, how many hours does he work in one week, not including Sunday?

2. How many inches in 10 feet? How many eggs in 10 dozen? How many months in 10 years?

3. How many square feet in 1 square yard? In 10 square yards?

4. If there are 10 square feet of window glass in one window, how many square feet in 8 such windows?

5. Mr. Reed had 70 sheep. Wolves killed three-tenths of them. How many were left?

6. How many marble tiles 1 foot square will be required to pave a hall that is 10 feet wide and 40 feet long?

7. How many square feet are there in the walls of a room that is 10 feet high and 10 feet square?

8. It is 6 miles to a village. A man goes and returns 5 times each week. How far does he travel in 3 weeks?

9. There are 10 rooms in a house. In each room there are 2 large pictures and 3 small ones. How many pictures are there in the house?

10. In one car each seat will hold 5 persons; in another, 6 persons. In each car there are 10 seats. How many persons may be seated in the 2 cars?

11. A train of 4 cars has in the first car 45 persons, in the second 54, in the third 65, and in the fourth 59. How many persons are in the train?

12. A ten-story building has 10 windows in each of the first 6 stories, and 8 windows in each of the remaining 4 stories. How many windows in the entire building?

13. A table is 10 feet long and $4\frac{1}{2}$ feet wide. What is the perimeter? What is the area?

1. David had 3 Wyandotte hens, each of which laid an egg a day in March and April. How many eggs were laid by the 3 hens during those 2 months?

2. He sold all the eggs, for setting, at $1.50 per dozen, how much did he receive for them?

3. Adele bought 5 geraniums at 15¢ each. She made 2 cuttings from each and potted all the plants. How many plants did she pot?

4. She sold all her geranium plants at 20¢ each. How much did she receive for them? How much did she gain?

5. A $1.25 doll was dressed for a Christmas sale. Her hat and shoes cost 72¢, her house dress 87¢, her street dress $1.40. What was the whole expense of the doll and all of her clothes?

6. This doll sold for $8.00. What was the gain?

7. Clara earned enough money to buy a ping-pong set by selling roses at a gain, or profit, of $1.20 a dozen. She sold to 6 customers a half-dozen each. How much did the ping-pong set cost?

8. Isabel bought a pony for $40. Her father gave her a pony carriage which cost twice as much as the pony. How much did the pony and carriage cost?

9. Caleb earned $72 in 4 weeks by driving an automobile. How much did he earn per week?

10. Richard ran his electric launch 48 miles in 6 hours. What rate was that per hour?

11. A clerk sold 9 electric light bulbs for $1.62. How much was that for each?

12. Mr. Page worked in a berry-box factory. He made 966 boxes in 6 days. How many was that per day? At that rate how many could he make in 9 days?

1. Add:

$1.55	$9.76	$ 9.30	$25.71	$85.94
.08	3.72	12.10	20.04	57.38
4.50	1.31	17.68	47.37	19.99
5.17	7.75	24.33	.75	6.43
8.69	.87	9.77	8.10	.98

2. Subtract:

$56.29	$54.54	$13.74	$99.90	$107.60
15.25	24.32	7.55	93.24	89.25
$10.34	$45.32	$77.55	$321.76	$446.82
7.25	22.50	35.95	145.09	128.82

3. Multiply:

$2.63	$16.24	$37.58	$56.17	$10.29
2	3	4	5	5
$207.20	$450.75	$327.06	$525.50	$290.40
7	6	7	8	9

4. Divide:

2)$56.24	2)$38.56	3)$27.96	3)$45.21
4)$892.64	5)$125.75	5)$530.50	6)$426.84
7)$637.84	8)$968.72	8)$656.32	9)$468.63

5. I bought a horse for $97.00, kept him at a livery stable for six months at $12.00 a month, and then sold him for $175.00. How much did I gain or lose?

6. Mr. A. had $756.48. Mr. B. had $327.16 and Mr. C. had $258.92. How much did they all have together?

1. What is the perimeter of an 11-inch square?

2. What is the area of an 11-inch square?

3. Three loads of hay will winter one cow. How many cows will 33 loads winter?

4. How many inches in 3 feet? In 5 feet? In 7 feet? In 11 feet?

5. How many square inches in a rectangle that is 11 inches long and 3 inches wide? 11 inches long and 5 inches wide? 11 inches long and 7 inches wide? 11 inches long and 9 inches wide? 11 inches wide and 12 inches long?

6. How many days in 11 weeks and 4 days?

7. Find the cost of one-eleventh of 55 pounds of sugar at 6¢ a pound.

8. What is the cost of three-elevenths of 99 cords of wood at $5 a cord?

9. Find the cost of one-eleventh of 22 sheep at $7 each. Of three-elevenths at $9 each.

10. I paid $110 house rent and one-eleventh as much for gas. How much did I pay for both?

11. Isaac planted 88 seeds in 11 hills. How many seeds did he put in one hill?

12. How many square inches in the top of a mantel that is 11 inches wide and 48 inches long?

13. All but one-eleventh of $99 was divided among 3 people. How much did each receive?

14. How many feet of ribbon will be required to bind a portfolio that is 11 inches square, allowing 4 inches extra for corners? How many yards?

15. What is the perimeter of a rectangle 7 by 11 inches? What is the area?

1. Ben went away to school September first. He came home for a short visit March first. How many months had he been at school? What part of a year?

2. Percy saved a dollar a month to pay for a watch costing $20. How many years and how many months over did it take him to save enough money?

3. Beatrice went to school 9 months each year. What part of a year did she attend school? What part of a year did she have vacation?

4. Edward, who is $9\frac{1}{2}$ years old, is how many months old? His brother is 18 months younger than Edward. How old is his brother?

5. Rudolph bought 2 settings of a dozen eggs each at the rate of 5¢ for each egg. How much was that for a dozen? For both settings?

6. Sarah made fruit salad for a luncheon. She bought 18 oranges at 20¢ a dozen, 19 peaches at 36¢ a dozen, $\frac{1}{2}$ pound of white grapes for 12¢. The other articles necessary to make the salad amounted to 72¢. What was the whole expense?

7. Sam raised 7 broods of 12 chickens each. In 5 broods all the chickens lived, in one $\frac{3}{4}$ lived, and in one $\frac{2}{3}$ lived. How many from the 7 broods lived?

8. Louise went with her mother to buy a new dress. They bought 12 yards of cloth at $1.25 a yard, 6 yards of lining at 12¢ a yard, 12 yards of trimming at 7¢ a yard, and $1\frac{1}{2}$ dozen buttons at 20¢ a dozen. What was the cost of the materials for the dress?

9. Richard earned $1\frac{1}{2}$¢ a box picking berries. He picked 12 boxes a day for a week. How much money did he earn in that way during the week?

1. Charles, George, and Stephen bought a fruit-stand, Charles paid one-half of the expense, George paid one-fourth. What part of the expense did Stephen pay?

2. The whole expense of buying the stand was $8.00. How many dollars did each boy pay?

3. They bought 10 dozen oranges at $.20 a dozen, 4 pecks of apples at one dollar a bushel, and 15 dozen lemons at $.20 a dozen. How much did the fruit cost?

4. They sold the 10 dozen oranges at $.40 a dozen. How much money did they get for them?

5. What was the profit, or gain, on the oranges?

6. They sold 8 dozen lemons at $.25 a dozen and 7 dozen at $.30 a dozen. How much money did they get for the lemons?

7. How much did they make on the lemons?

8. They sold the 4 pecks of apples at $.40 a peck. How much money did they get for the apples?

9. How much profit was there on the apples?

10. How much profit did they make on all of the fruit?

11. They used half of their gain in making a larger stand. How much money did they use in this way?

12. How much money did they have left to invest in more fruit?

13. What would be the gain at the same cost and selling prices on 14 dozen oranges? On 15 dozen lemons?

14. At the cost in problem 3 what would they gain from selling: 5 dozen oranges at 5¢ apiece? 4 dozen lemons at 5¢ apiece? 6 pecks of apples at 60¢ a peck?

15. If the boys had divided the gain equally among themselves after problem 10, instead of investing it, how much would each have received?

Elizabeth and Helen went to cooking-school. They learned to make this breakfast for 8 persons and to find its cost.

Muskmelons
Puffed Rice with Cream
Broiled White Fish **Fried Potatoes**
Cream Toast **Graham Biscuit**
Coffee

They used 4 melons at 7¢ each, 5 pounds of fish at 12¢ a pound, ½ package of puffed rice, at 10¢ a package, 1 quart of potatoes, at 16¢ a peck, a half of a loaf of bread at 5¢ a loaf, 2 pints of cream, at 18½¢ a pint, 10 tablespoonfuls of coffee (in all ⅕ of a pound), at 40¢ a pound, 1 dozen Graham biscuits, at 10¢ a dozen, 1½ pounds of butter, at 28¢ a pound, salt, pepper, and lard, amounting to 5¢, and enough fuel to cost 10 cents.

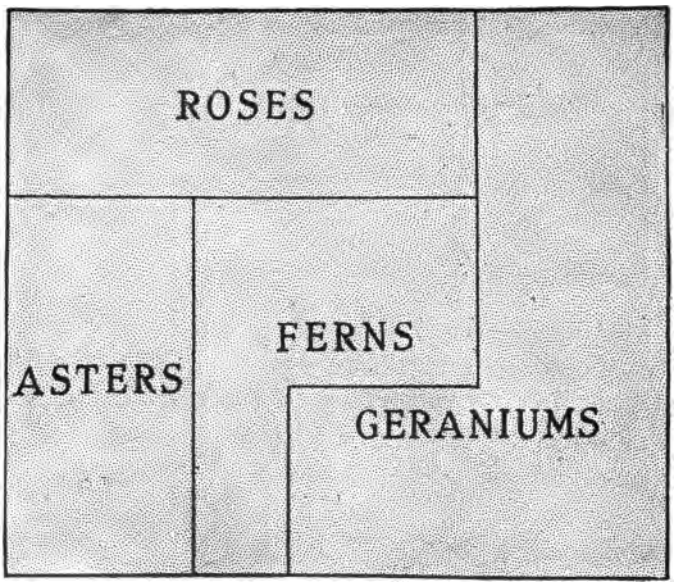
1. What was the cost of each kind of food? Of the whole breakfast? Cost for each person? What would be the cost of this breakfast omitting the melons?

2. Paul and his father went to a restaurant, where they ordered as follows:

2 orders asparagus soup at 15¢ each.
2 orders fresh mackerel at 20¢ each.
2 orders small steak at 45¢ each.
2 orders new potatoes with cream sauce at 15¢ each.
1 order cucumber salad with wafers, 20¢.
1 order lemon ice with ladyfingers, 15¢.
1 order vanilla ice cream, 10¢.
2 orders coffee at 10¢ each.

What was their bill?

PART III



This is the plan of a garden in which 1 inch stands for 12 feet.

1. Find in feet the length of the garden. The width. The perimeter.

2. Find in feet the perimeter of the space given to asters; to roses; to ferns; to geraniums.

3. How many 12-foot squares are used for asters? For ferns? For geraniums?

4. There are gravel walks on the division lines between the parts and around the whole garden. How many feet of gravel walk are there around the asters? The ferns? The geraniums? How many feet of gravel walk around the whole garden?

1. The space given to asters is how many feet long? How many feet wide? How many square feet does it contain?

2. The space given to roses is how long? How wide? How many square feet does it contain?

3. A 12-foot square contains how many square feet?

4. The space given to ferns contains how many 12-foot squares? How many yards of walk enclose it?

5. How many square feet are given to ferns?

6. The space given to geraniums contains how many 12-foot squares? How many square feet?

7. Find, in two ways, the number of square feet given to all the different kinds of flowers.

8. A 3-wire fence, 30 feet long, extends along the side of the rose garden. How many feet of wire were used? How many yards?

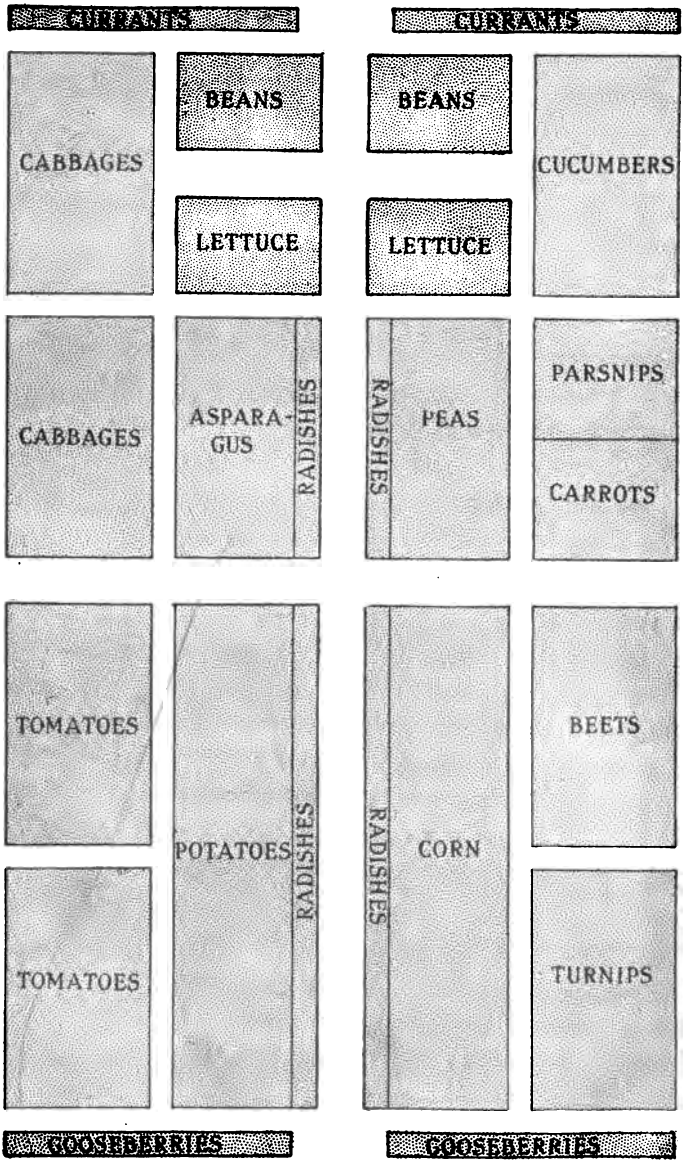
9. In the geranium garden there are 7 rows of Martha Washingtons with 15 plants in each row, 12 rows of rose-geraniums with 8 plants in each row, and 11 rows of scarlet geraniums with 8 plants in each row. How many plants are in this garden?

10. A gardener is paid $36 per month. How much is that per week?

11. The gardener hires a boy to help him 2 days in the week, at 10 cents an hour, 6 hours a day. How much does the boy earn a week?

12. The plants in the geranium garden (see **9** above), were bought at wholesale and cost 10 cents each. How much did they all cost?

13. The asters were of 5 kinds: yellow, pink, white, shaggy, and mixed. There were 6 rows of each kind with 12 plants in each row. How many plants were in the aster garden?


CURRANTS
CURRANTS
CABBAGES
BEANS
LETTUCE
BEANS
LETTUCE
CUCUMBERS
CABBAGES
ASPARA-
GUS
RADISHES
RADISHES
PEAS
PARSNIPS
CARROTS
TOMATOES
TOMATOES
POTATOES
RADISHES
RADISHES
CORN
BEETS
TURNIPS
GOOSEBERRIES
GOOSEBERRIES

1. In the plan of a garden on page 134, one inch stands for 8 feet. $\frac{1}{8}$ of an inch stands for how many feet? $\frac{1}{4}$ of an inch stands for how many feet? $\frac{1}{2}$ an inch?

2. Find the length of the plan; the width; the area.

3. What is the length of the garden? The width?

4. What are the dimensions of each of the currant patches? What is the area of each?

5. Find the area of each space given to gooseberries.

6. Find the length of the long middle path; the width; the number of square feet in it.

7. How wide is each of the other paths?

8. Find the length, width, and area of each bean bed.

9. How many square feet in the two lettuce beds?

10. Find the dimensions and the area of each of the spaces given to radishes. How many square feet in all are given to radishes?

11. What are the dimensions of the asparagus bed? What is the area?

12. Answer the same questions for the space given to peas.

13. Find the dimensions and area of the cucumber bed.

14. What other spaces have the same area?

15. How many square feet in all are given to cabbages? To tomatoes?

16. The parsnip patch is how wide? How long? What is the area? Answer like questions for the carrot patch.

17. The parsnip space and the carrot space together are equal in area to what space?

18. Find the dimensions and the area of the space given to corn; to potatoes.

19. How many square feet in all are given to vegetables?

Answer all you can orally.

1. What will 4 gallons of molasses cost at \$.22 a quart?

2. At \$.60 a bushel, what will 5 pecks of potatoes cost?

3. At \$.18 a dozen, what will 6 dozen eggs cost?

4. At \$.26 a pound, what will 24 ounces of butter cost?

5. How many hours from 9:30 A.M. to 6:30 P.M.?

6. A rectangle 4 feet by 9 feet contains how many square feet? How many square yards?

7. How many strips of carpet 1 yard wide will it take to carpet a room 18 feet wide?

8. How many yards long must a strip of carpet be to reach from wall to wall of a room 21 feet long?

9. If a room is 18 feet wide and 21 feet long, how many yards of carpet a yard wide will be needed to cover the floor?

10. At \$.50 a yard, what will the carpeting of such a room cost?

11. How many minutes are there between 11:15 A.M. and 3:45 P.M.?

12. At 4 cents a quart, how many pints of berries can be bought for 40 cents?

13. At \$.02 each week-day, and \$.05 each Sunday (4 Sundays), how much will the paper cost for March?

14. At 7 cents a yard, what will be the cost of three bunches of braid, each containing 5 yards?

15. A boy bought 20 evening papers for \$.15 and sold them for 1 cent each. How much did he get for them? What was his gain?

16. How many persons paid cash fares if a street-car conductor collected \$4.50 in 5-cent fares?

17. At 3 for \$1, how many balls can be bought for \$7?

1. What will thirty marbles cost at 6¢ a dozen?

2. What will six tablets cost at 2 for 15¢?

3. At three for 5¢, how many oranges can you buy for a quarter-dollar? For 75¢?

4. At 4 for 10¢, how many oranges can you buy for 60¢? For $1?

5. At 40¢ a yard, what is the cost of $2\frac{1}{8}$ yards of ribbon? Of 6 yards? Of $6\frac{1}{4}$ yards?

6. At the same price, what is the cost of $6\frac{3}{4}$ yards? Of $\frac{3}{8}$ of a yard?

7. Andrew kept an account of his earnings and savings in March and April. He earned $.15 a day from his paper route and 5¢ a day for carrying a lunch-basket, 7 days in the week. He earned also 50¢ a month for cleaning the cellar, and $1.20 a month for mowing the lawn.

8. How much did he earn each week carrying papers?

9. How much did he earn each week carrying lunch?

10. How much did he earn in March carrying lunch?

11. How much did he earn altogether in March? In April?

12. How much did he earn in the 2 months by carrying papers? By carrying lunch? If he had not carried the lunch-basket, how much would his earnings for the two months have been?

13. Andrew spent 6 cents every day for car fare, and $.10 a day for lunch. How much had he left each week?

14. At the end of the two months he bought a 5-dollar watch and a rake costing $1.25. How much money did he spend? How much had he left from the earnings of the 2 months? Add what he had left to $5 and find how many weeks he could pay for his lunches with it.

HICKORY-NUT CAKE	WHITE CAKE
2 cups sugar (1 lb.)	1 cup butter ($\frac{1}{2}$ lb.)
1 cup butter ($\frac{1}{2}$ lb.)	1 cup sugar ($\frac{1}{2}$ lb.)
4 eggs, beaten separately	$\frac{1}{2}$ cup sweet milk ($\frac{1}{4}$ pint)
4 cups flour (2 lb.)	$1\frac{1}{4}$ cups flour (4c)
3 teaspoonfuls baking powder (1c)	3 teaspoonfuls baking powder (1c)
1 cup milk ($\frac{1}{2}$ pint)	Whites of 4 eggs
1 quart hickory nuts (1 lb. shelled)	1 teaspoonful vanilla (1c)

1. For making the hickory-nut cake, find the cost at the following prices:

Sugar at 6¢ a pound; eggs at 18¢ a dozen.
Butter at 24¢ a pound; flour at $2\frac{1}{2}$¢ a pound.
Hickory nuts at 30¢ a pound, shelled.
Baking powder as given in the rule.
Milk at 3¢ a pint; fuel at 3¢.

2. For the white cake, find the cost as follows:

Butter at 22¢ a pound; milk at 4¢ a pint.
Sugar at 5¢ a pound; flour at 4¢.
Baking powder and vanilla as given in the rule.
Eggs at 24¢ a dozen.

3. Counting the fuel at 2¢, find the cost of making the white cake.

4. If the two cakes were placed in the oven at the same time, what would be the difference in the cost of the fuel?

5. Mrs. Moore made 2 hickory-nut cakes and 3 white cakes to sell. Besides the expense of the materials, she charged 50¢ for the work of making each cake. How much did she receive for 1 hickory-nut cake? For 1 white cake? For all the cakes she sold?

6. How much more did she receive for the 3 white cakes than for the 2 hickory-nut cakes?

SCHOOL SUPPLIES

Box paper, per box	$0.35	Crayon pencils, each	$0.10
Pen tablet, each	.15	Colored pencils, each	.10
Envelopes, package	.05	Ink, small bottle	.05
Pencil tablet, small	.03	Erasers, each, 1c, 3c, or	.05
Pencil tablet, large	.05	Brass-edged rulers, each	.05
Penholder, each	.05	Note-books, thick, each	.10
Pens, per doz	.10	Paper fasteners, per doz	.05
Pencils, soft, each	.01	Note-book covers, small	.15
Pencils, medium, each	.03	Note-book covers, large	.25
Pencils, hard, each	.05	Pencil sharpeners, each	.05

ALICE SMALL,
Pleasantville, Ohio.

1 Box of paper	$0.35
1 Pencil tablet	.05
1 Hard pencil	.05
1 Eraser	.03
1 Brass-edged ruler	.05
1 Small book cover	.15

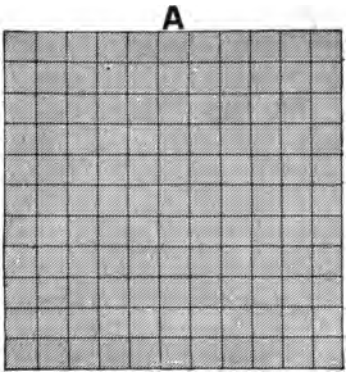
1. Alice bought a box of paper, a pencil tablet, a hard pencil, an eraser, a brass-edged ruler, and a small note-book cover. How much did she spend?

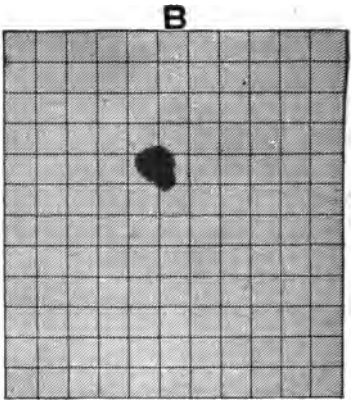
2. Charles bought three colored pencils, a bottle of ink, a thick note-book, a penholder, two dozen pens, two soft pencils, and a pencil tablet. How much did he spend?

3. Harry bought two packages of envelopes, three five-cent pencil tablets, 2 pen tablets, 2 pencils of each kind, a 5-cent eraser, and a brass-edged ruler. He gave the clerk a dollar. How much change was due him?

4. William bought a large note-book cover, a pencil sharpener, 2 dozen paper fasteners, 4 medium pencils, a 5-cent eraser, 2 pen tablets. He gave the clerk one dollar. What was the correct change?

5. At prices given in the above list, how much would it cost to supply a school of 45 children each with the following: a pen tablet; two 3-cent pencil tablets; a penholder; a dozen pens; 2 soft pencils, and a brass-edged ruler?





1. How many squares are there in one row of A? How many rows of 11 squares each in A? In B?

2. How many 11's in A? In B?

3. 11 equals what part of 22? Of 33? Of 44? Of 55? Of 66? Of 77? Of 88? Of 99? Of 110? Of 121? Of 132?

4. 22 equals how many 11's? What part of 44? Of 66? Of 88? Of 110? Of 132?

5. 33 equals how many 11's? What part of 66? Of 99? Of 132?

6. 44 equals how many 11's? How many 22's? What part of 88? Of 132?

7. 55 equals how many 11's? What part of 110?

8. 66 equals how many 11's? How many 22's? 33's? What part of 132?

9. 77 equals how many 11's?

10. 88 equals how many 11's? How many 22's? 44's?

11. 99 equals how many 11's? How many 33's?

12. 110 equals how many 11's? How many 55's?

13. 132 equals how many 11's? How many 22's? 44's? 66's?

TABLE OF ELEVENS

$11\times1=11$	$11\times4=44$	$11\times7=77$	$11\times10=110$
$11\times2=22$	$11\times5=55$	$11\times8=88$	$11\times11=121$
$11\times3=33$	$11\times6=66$	$11\times9=99$	$11\times12=132$

1. Add these numbers; subtract them; multiply them:

39	45	50	23	47	56	73	65	89	29
11	11	11	11	11	11	11	11	11	11

2. Divide:

11)33 11)55 11)77 11)22 11)44 11)66

3. Measure off and mark $5\frac{1}{2}$ yards on the floor. How many steps are there in $5\frac{1}{2}$ yards?

4. This distance, $5\frac{1}{2}$ yards, is called a rod. How many rods in 11 yards? In 22 yards? In 33 yards? In 44 yards?

5. How many are 2 times $5\frac{1}{2}$? 4 times $5\frac{1}{2}$? 6 times $5\frac{1}{2}$?

2	12	22
32	‖	42
52	62	72

3	13	23
33	‖	43
53	63	73

4	14	24
34	‖	44
54	64	74

5	15	25
35	‖	45
55	65	75

6	16	26
36	‖	46
56	66	76

7	17	27
37	‖	47
57	67	77

8	18	28
38	‖	48
58	68	78

9	19	29
39	‖	49
59	69	79

6. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. Draw the face of a clock. Make numbers on it like those in the picture. These are called Roman numerals. Cut the hands from stiff paper or cardboard and color them with ink. Fasten them to the face of the clock with a pin.

2. Show on the clock when it is 20 minutes to one; 10 minutes to 3; 5 minutes after 5.

3. Show these times in the order given: Eight thirty; eight forty-five; nine fifteen; ten ten; twelve fifteen.

4. Show these times: 1:45; 6:50; 3:20; 7:40; 2:37; 4:00.

5. What time is it when:

The minute hand is at 4, the hour hand nearest 2?
The minute hand is at 12, the hour hand at 3?
The minute hand is at 5, the hour hand nearest 1?
The minute hand is at 9, the hour hand nearest 12?

6. Show on the clock what time you have breakfast; luncheon; dinner; time of sunrise; sunset.

7. Show the time when school opens; when recess comes; when school closes.

8. Show the time of meeting of the class you like best.

9. Show the time when your grocery opens.

10. Add:

426	842	846	627	985
389	683	726	829	286
725	782	875	846	297

11. Subtract:

407	572	672	862	307
296	359	343	559	196

Answer all you can orally.

30 days hath September, April, June, and November;
All the others 31, except the second month alone,
Which has but 28 in line, till leap year gives it 29.

1. Write the names of the months of the year, and number them, in order, beginning with January.

2. Write the number of days there are in each month after its name.

3. What is the second month? Fifth month? Ninth month? Sixth month? Eighth month? Eleventh month?

4. How many days are there in all the months which contain 31 days? How many days in all the months which contain 30 days?

5. How many days in January? April? March? February? June? August? September? July? October? November? December?

6. How many days in all the first 3 months of the year? In all the last 3 months of the year?

7. How many days in all the first 6 months of the year? In all the last 6 months of the year?

8. What is the difference in days between the first 6 months and the last 6 months of the year?

9. How many days in February, March, and April together?

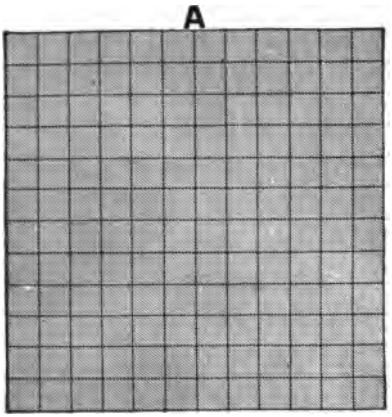
10. In April, May, and June together?

11. In July and August together?

12. In September, October, and November together?

13. A man left home in the morning the first day of April and returned home in the evening the last day of July. How many days was he away from home?

14. How many days in the first, third, fifth, seventh, and eighth months together?



1. How many squares are there in one row of A?

2. How many rows of 12 squares each in A?

3. How many squares are there in all of A?

4. 12 equals what part of 24? Of 36? Of 48? Of 60? Of 72? Of 84? Of 96? Of 108? Of 120? Of 132? 144?

5. 24 equals how many 12's? What part of 48? Of 72? Of 96? Of 120? Of 144?

6. 36 equals how many 12's? What part of 72? Of 108? Of 144?

7. 48 equals how many 12's? How many 24's? What part of 96? Of 144?

8. 60 equals how many 12's? What part of 120?

9. 72 equals how many 12's? How many 24's? 36's? What part of 144?

10. 84 equals how many 12's?

11. 96 equals how many 12's? How many 24's? 48's?

12. 108 equals how many 12's? How many 36's?

13. 120 equals how many 12's? How many 24's?

14. Count by 12's to 144.

TABLE OF TWELVES

$12\times1=12$	$12\times4=48$	$12\times7=84$	$12\times10=120$
$12\times2=24$	$12\times5=60$	$12\times8=96$	$12\times11=132$
$12\times3=36$	$12\times6=72$	$12\times9=108$	$12\times12=144$

1. Add these numbers; subtract them; and multiply them:

28	53	45	33	48	57	74	66	90	38
12	12	12	12	12	12	12	12	12	12
67	89	78	49	96	50	87	29	82	59
12	12	12	12	12	12	12	12	12	12

2. Divide:

12)36	12)60	12)72	12)28	12)49	12)56
12)71	12)108	12)99	12)120	12)84	12)144

3. $4\times9=?$ $5\times9=?$ $36\times6=?$ $72\times12=?$
$8\times7=?$ $3\times12=?$ $49\times7=?$ $88\times8=?$

2	12	22	3	13	23	4	14	24	5	15	25
32	**12**	42	33	**12**	43	34	**12**	44	35	**12**	45
52	62	72	53	63	73	54	64	74	55	65	75

6	16	26	7	17	27	8	18	28	9	19	29
36	**12**	46	37	**12**	47	38	**12**	48	39	**12**	49
56	66	76	57	67	77	58	68	78	59	69	79

4. Add the heavy center number to each number in the same large square. Subtract it from each number larger than itself. Multiply in the same way.

1. Review pages 55 and 93 as oral work.

2. How many minutes in 1 hour? In 2 hours? 3 hours? 5 hours? 8 hours? One-half an hour?

3. What part of an hour is 10 minutes? 30 minutes? 45 minutes? 15 minutes? 20 minutes?

4. How many hours in a week?

5. How many weeks in 147 days?

6. A boy is 8 years and 4 months old. How many months old is he?

7. A boy leaves home at 7:30 each morning and returns from work at 6:15 in the evening. How long is he away from home? How long is he away in 6 days?

8. A train leaves the station at 7:15 and arrives in the city at 7:42 in the morning. Returning, it leaves the city in the evening at 5:40 and arrives at 6:11. How long does a man spend on the train who goes back and forth each day for 10 days?

9. A boy leaves home for school at 8:35 and reaches the school room at 2 minutes before 9. He returns home for lunch at noon, taking the same time on the way each trip. How long is he on the way in 1 day? In 5 days?

10. School begins at 9 o'clock and closes at 15 minutes before 12; opens at 1:30 and closes at 3:45. How long is the forenoon session? How long is the afternoon session? How long are both together?

11. If 15 minutes were allowed for recess both morning and afternoon, how long would the sessions be together?

12. Copy on a separate sheet, filling the blanks:

....minutes (min.)	=1 hour (hr.)	....days (da.)	=1 year. (yr.)
....hours (hr.)	=1 day (da.)	....weeks (wk.)	
....days (da.)	=1 week (wk.)	....months (mon.)	

1. How many months old is a boy who is 7 years old? How many weeks old is one who is 11 months old?

2. How many months old is a boy who is 11 years old? 12 years old?

3. How many minutes are there in one-half day?

4. How many hours from 5 in the morning until 9 at night?

5. A boy goes to bed at 9 o'clock and gets up at 6. How long is he in bed?

6. How many minutes from 8 P.M. to 9:15 P.M.?

7. A boy plays ball in the morning from 7 until 9, and in the afternoon from 4 until 6. How many hours does he play?

8. A train leaves Chicago at 9 o'clock in the morning and arrives in Cincinnati at 6 in the evening. How many hours is it on the way?

9. A train leaves Chicago at 10:30 in the morning and reaches Buffalo at 12:20 at night. How many hours is it on the way?

10. A train leaves Washington at 9 o'clock in the morning, and reaches New York at 2:15 in the afternoon. How many hours is it on the way?

11. A train leaves Toledo at 4:30 P.M., reaches Cleveland at 9:10 P.M., and Buffalo at 2:40 A.M. How long is it on the way from Toledo to Cleveland? How long from Toledo to Buffalo?

12. A boat leaves Chicago at 6:30 in the morning, reaches Milwaukee at 11:30, and leaving Milwaukee at 4:15 in the evening, reaches Chicago at 9:15. How many hours does the boat run in making the round trip? How many hours is it from the time the boat leaves Chicago until it returns?

1. Review pages 87 and 95 as oral work.

2. Albert is $5\frac{1}{2}$ years old. Edwin is 18 months older than Albert. How old is Edwin? What is the difference in their ages, in years and parts of a year?

3. Lyman ran a mile in 10 minutes. John walked the same distance in a quarter hour. It took John how many minutes longer than Lyman? How many seconds?

4. A golf-player hired a caddy who worked for him 3 hours and 20 minutes, at the rate of 15 cents an hour. How much did the caddy earn?

5. Gerald earned $5 picking strawberries at the rate of 10 cents an hour. How many hours did he work?

6. Arthur, Harold, and Burton rented a boat for 6 hours for $1.20. How much was that per hour? The boys divided the expense equally. How much did each pay?

7. Paul and Herbert ran an automobile at the rate of 96 miles in 12 hours. How far was that per hour?

8. A carrier pigeon flew a distance of 560 miles in 7 hours. How far was that per hour? At this rate, how far could the pigeon fly in 5 hours? In 12 hours?

9. Wallace drove to his grandfather's, a distance of 60 miles, in 12 hours. How far was that per hour?

10. Willie took a 5-hour steamboat ride, and in that time traveled 70 miles. How far was that per hour?

11. Frank and Willis ran a race. Frank ran a mile in 7 minutes. Willis ran the same distance in 12 minutes. What part of an hour is the difference?

12. Paul's hat fell into the river and 6 hours later was found 24 miles farther down the river. How fast was the river flowing?

1. Frank and David had an animal show. They had 12 guinea pigs, 12 white mice, 7 rabbits, 6 pigeons, 5 dogs, and a pony. How many animals had they?

2. It cost them 55 cents a day for feed for the animals. How much was that for a week? For 6 weeks?

3. They had the show in a lot, a part of which they fenced off. This enclosed space was 20 feet long and 12 feet wide. What was the area?

4. The pony was taught to walk a flat board which ran around the top of the fence. How far did he walk in going around it once?

5. The pony walked around on the board 5 times in 3 minutes. How many feet was that per minute?

6. There were three performances each day. The morning one lasted from 8:45 to 9:30. How long was it?

7. The admission to the morning performance was 3¢, to the afternoon performance 5¢, and to the evening performance 7¢. The first day of the show 8 persons attended in the morning, 7 in the afternoon, and 12 in the evening. How much did the boys receive during that day? How much had they left after subtracting the price of the feed for the animals?

8. The boys hired a phonograph for 2¢ an evening. How much did it cost for a week of 6 days? How much did the phonograph and food cost for 4 weeks?

9. They placed a 28-foot ladder in an upright position, with platforms at equal distances apart on it. The first platform was $\frac{1}{4}$ of the way up. One of the dogs was taught to jump down from one platform to the next. How far was the first platform above the ground? The second? The third? How far was the first from the third?

The table below shows the number of clear days, of partly cloudy days, and of cloudy days for each month of the year 1907.

Season	Month	Clear	Partly Cloudy	Cloudy	Total
Spring	March	3	15	13	
	April	7	8	15	
	May	10	9	12	
Summer	June	12	11	7	
	July	3	19	9	
	August	11	15	5	
Autumn	September	7	11	12	
	October	10	10	11	
	November	12	10	8	
Winter	December	6	3	22	
	January	6	5	20	
	February	6	14	8	

1. Name the months of spring. Of summer. Of autumn. Of winter.

2. How many clear days were there in March? In April? In May? In the Spring months?

3. How many clear days were there in the Summer months? In the autumn months? In the winter months?

4. How many cloudy days were there in March? In April? In May? In all the spring months?

5. How many cloudy days were there in the Summer months? The autumn months? The winter months?

6. How many partly cloudy days were there in all the spring months? In all the summer months?

7. How many partly cloudy days were there in all the autumn months? In all the winter months?

8. How many more clear days were there in all the summer months than in all the winter months?

9. Which season of 1907 had the largest number of cloudy days? How many cloudy days had this season?

1. Which season of 1907 had the smallest number of cloudy days? How many cloudy days had this season?

2. How many more cloudy days were there in the winter than in the spring?

3. How many more cloudy days were there in the winter than in the autumn?

4. Which season of 1907 had the largest number of days partly cloudy? Which had the next largest number of partly cloudy days?

5. How many more partly cloudy days were there in the summer than in the spring?

6. How many more partly cloudy days were there in the summer than in the autumn? Than in the winter?

7. How many clear days were there in the whole year 1907?

8. How many partly cloudy days were there in the whole year 1907? How many cloudy days?

9. How many more cloudy days than clear days were there in the whole year?

10. How many more partly cloudy days than clear days were there in the whole year?

11. Fill out on a separate slip the blanks in the column of the table that is headed "Total," by adding together the cloudy, the partly cloudy, and the clear days?

12. How many days are there in the spring season? In the summer season? In the winter? In the autumn?

13. How many more clear days were there in the whole year than there are days of all kinds in the Spring season?

14. How many more cloudy days than clear days were there in March? In April? In May? In December? In January? In February?

Copy on a separate sheet, and fill the blanks:

$11\times2=2\times11=$ two 10's and two 1's $=20+2=22$.

$12\times2=2\times12=2$ 10's and 2 2's $=20+4=24$.

1. $11\times3=3\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
2. $12\times3=3\times12=$.... 10's and .... 2's $=$....$+$....$=$.....
3. $11\times4=4\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
4. $12\times4=4\times12=$.... 10's and .... 2's $=$....$+$....$=$.....
5. $11\times5=5\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
6. $12\times5=5\times12=$.... 10's and .... 2's $=$....$+$....$=$.....
7. $11\times6=6\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
8. $12\times6=6\times12=$.... 10's and .... 2's $=$....$+$....$=$.....
9. $11\times7=7\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
10. $12\times7=7\times12=$.... 10's and .... 2's $=$....$+$....$=$.....
11. $11\times8=8\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
12. $12\times8=8\times12=$.... 10's and .... 2's $=$....$+$....$=$.....
13. $11\times9=9\times11=$.... 10's and .... 1's $=$....$+$....$=$.....
14. $12\times9=9\times12=$.... 10's and .... 2's $=$....$+$....$=$.....

15 Read 1 to 14 and fill the blanks orally.

Copy the following, filling the blanks:

16. $6\times13=6$ 10's$+6$ 3's $=$....$+$....$=$.....
17. $6\times14=$....10's$+$....4's$=$....$+$....$=$.....
18. $6\times15=$....10's$+$....5's$=$....$+$....$=$.....
19. $7\times13=$....10's$+$....3's$=$....$+$....$=$.....
20. $7\times14=$....10's$+$....4's$=$....$+$....$=$.....
21. $7\times15=$....10's$+$....5's$=$....$+$....$=$.....
22. $8\times13=$....10's$+$....3's$=$....$+$....$=$.....
23. $8\times14=$....10's$+$....4's$=$....$+$....$=$.....
24. $8\times15=$....10's$+$....5's$=$....$+$....$=$.....
25. $9\times13=$....10's$+$....3's$=$....$+$....$=$.....
26. $9\times14=$....10's$+$....4's$=$....$+$....$=$.....
27. $9\times15=$....10's$+$....5's$=$....$+$....$=$.....

Read the following, filling the blanks orally:

1. 13 ÷ 6 = ... and .... over; 15 ÷ 6 = ... and .... over;
23 ÷ 6 = ... and .... over; 25 ÷ 6 = ... and .... over.

2. 15 ÷ 7 = ... and .... over; 17 ÷ 7 = ... and .... over;
24 ÷ 7 = ... and .... over; 39 ÷ 7 = ... and .... over.

3. 13 ÷ 8 = ... and .... over; 23 ÷ 8 = ... and .... over;
34 ÷ 8 = ... and .... over; 44 ÷ 8 = ... and .... over.

4. 14 ÷ 9 = ... and .... over; 26 ÷ 9 = ... and .... over;
39 ÷ 9 = ... and .... over; 50 ÷ 9 = ... and .... over.

5. 22 ÷ 10 = ... and .... over; 34 ÷ 10 = ... and .... over;
43 ÷ 10 = ... and .... over; 57 ÷ 10 = ... and .... over.

6. 32 ÷ 11 = ... and .... over; 42 ÷ 11 = ... and .... over;
53 ÷ 11 = ... and .... over; 68 ÷ 11 = ... and .... over;
71 ÷ 11 = ... and .... over; 79 ÷ 11 = ... and .... over.

7. 28 ÷ 12 = ... and .... over; 37 ÷ 12 = ... and .... over;
42 ÷ 12 = ... and .... over; 49 ÷ 12 = ... and .... over;
53 ÷ 12 = ... and .... over; 78 ÷ 12 = ... and .... over.

8. A boy read 10 pages a day outside of his school work. How many pages had he read at the end of 2 years of 365 days each?

9. James misspelled 2 words a week for the first half of the year and 1 word a week for the last half. In a school year of 40 weeks, how many words did he miss?

10. A girl was absent from school 1 day every 2 weeks. How many days was she present in 40 weeks?

11. A man worked 11 months and had 1 month vacation every year. How many months did he work in 9 years?

12. Belle buys a dozen caramels for 5 cents, once a week. How much money does she spend for caramels in a year of 52 weeks? How many caramels does she buy in a year?

WRITING AND READING NUMBERS

1. 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are called figures. All numbers, large and small, are written with these figures. How many different figures are there?

Third place.	Second place.	First place.
3	3	3

In the number, 333, the 3 in the first place means 3 ones, or 3 units; the 3 in the second place means 3 tens, or thirty; the 3 in the third place means 3 hundreds. The entire number may be read also, 333 ones, or 333 units, or three hundred thirty three.

2. In 888, what does the 8 in the first place mean? In the second place? In the third place? Read the entire number.

3. Read these numbers: 24; 634; 543; 270; 814; 763.

The places are named as shown below:

		Units, or ones.			Thousands.	Units, or ones.		
Thousands.	Hundreds.	Tens.	Units, or ones.		Tens.	Units, or ones.	Hundreds	Tens.	Units, or ones.
5,	3	6	1		2	9,	7	8	4

The number 5361 is read, five thousand three hundred sixty-one. The number 29,784 is read, twenty nine thousand seven hundred eighty-four.

1. Read these numbers:

5784	752	9872	6375	365
586	7678	56498	988	28989
2987	65425	674	37988	6543

2. Write the following numbers, with units in the right hand column, with tens, hundreds, and thousands in their columns as shown above:

Seventeen. Two hundred twenty-seven. One hundred seven. Three hundred twelve.

Sixty-eight. Sixty-two hundred eighty.

Eleven thousand. Eight hundred. One thousand two hundred. Six hundred twenty-five.

One thousand sixty. Two hundred seventy-five.

One thousand six hundred fifty. One hundred seven.

One thousand ten. Forty-one thousand one hundred.

Five thousand six hundred fifty-five. Nine hundred.

Three thousand three hundred. Seventy-five.

Three thousand thirty. Four hundred twenty-five.

3. Write in words or read from the page:

125	683	41200	4816	35090
307	2469	3049	31000	847
590	303	5060	5004	3005
483	35791	2009	3100	4200

In writing numbers for addition and subtraction, it is convenient to place all the units in a column, all the tens in a column, and so on.

4. Write for addition the following numbers:

640, 35, 1282, 6, 821, 64, 8, 2305

5. Write the following for subtraction:

From 872 take 6. From 6475 take 242. From 3684 take 27.

Answer all you can orally.

MEASURE OF LENGTHS

1. Measure off distances 1 inch, 1 foot, 1 yard, 1 rod (See problem 4, page 141).

2. Robert repaired 2 rods of fence for his father. How many yards did he repair? How many feet?

3. Susan had a hat which measured $1\frac{1}{3}$ yards around the rim. On the rim was a knot of ribbon. The hat blew off and rolled down the street. There were 9 marks in the dust made by the knot of ribbon. How many yards did the hat roll?

TABLE

1 rod (rd.) = $16\frac{1}{2}$ feet (ft.), or $5\frac{1}{2}$ yards (yd.)
1 yard (yd.) = 3 feet.
1 foot (ft.) = 12 inches (in.)

4. A pole 1 rod long is sometimes used to measure length. Often a yard stick, or a foot ruler, is used for the same purpose. With which one could the length of a city block be measured most quickly? The length of the school room? Of the teachers' desk?

5. A square-cornered lawn is 75 ft. long and 24 ft. wide. How many feet around the lawn? How many yards?

6. Richard's home is 8 blocks from the school house. The blocks are 40 rods long. How many rods is his home from the school?

7. How many yards are there in 2 rods? How many yards is Richard's home from the school?

8. A square-cornered city block, 600 feet long and 468 feet wide, was fenced in and used as a playground. How many feet long was the fence? How many yards long?

Answer all you can orally.

1. Review pages 41 and 113 as oral work.

2. What does the drawing on p. 113 represent? To what scale is it drawn?

3. Measure off and cut out a square yard of paper. Divide it into square feet and cut again. Divide each side of one square foot of paper into inches and mark the points of division. How many inches are there on each side of the square foot?

4. Connect exactly opposite points by drawing straight lines. How large is each small space? How many square inches are there in 1 row? In all the rows? In 1 square foot?

TABLE

1 square yard (sq. yd.) = 9 square feet (sq. ft.)
1 square foot (sq. ft.) = 144 square inches (sq. in.)

5. A checker-board is 15 inches square. How many square inches are there in a strip of it 5 inches wide? In a strip of it 10 inches wide? In the entire board?

6. The top of a table is $7\frac{1}{2}$ feet long and $4\frac{1}{2}$ feet wide. A table-cloth placed upon it hangs down 9 inches over the edges. How many square feet are there in the table cloth? How many square yards?

7. A bath room is 9 feet long and 5 feet wide. The floor is covered with tiling each piece of which is 4 inches square. How many square feet are there in the floor of the bath room? How many pieces of tiling are there in one square foot? How many pieces in the floor of the bath room?

8. Helen made a quilt for her doll's bed, 16 inches long and 10 inches wide, of pieces 2 inches square. How many pieces are there in it?

1. Review pages 115, 141 and 145 as oral work.

2. Ben and Richard were given a box of tools for Christmas. Among the tools were a foot-ruler, a yard-stick, and a long tape-measure. Their father allowed them to have a vacant lot for a play-yard. They fenced the lot with wire, using 80 feet of wire to go around it once. The lot was 20 feet wide. How long was it? How many yards long was the lot? How many yards wide?

3. The boys made a 3-wire fence. How many feet of wire did they use?

4. In making the fence they placed posts at the corners and every 5 feet between. How many posts were used?

5. A flower-bed was made along the fence on one side of the lot. It was 3 feet wide and the length of the lot How many square feet were there in it?

6. In one corner of the lot the boys built a workshop. It was built against the corner of the fence and extended 9 feet along one side of the lot and 6 feet along the adjoining side. What was the area of the floor? How many square yards were in it?

7. The workshop was 7 feet high. How many square feet were there in each side wall? Each end wall? All the walls? How many square yards in all the walls?

8. There were 2 windows in the shop. One had 2 panes, each 12 by 15 inches, and the other 4 panes, 10 by 12 inches. How many square inches of glass were used?

9. The door was 6 feet high and 3 feet wide. How many square yards of space did it fill?

10. Under a tree in one end of the lot the boys built a bench 6 feet long and 18 inches wide. What was the area of the top of the bench?

Answer all you can orally.

1. Review pages 44, 45 and 98 as oral work.

2. Dorothy bought for the Christmas baking: 3 quarts of molasses, at 12¢ a quart; 2 quarts of maple syrup, at 22¢ a quart; 2 quarts of cream, at 20¢ a quart; ½ gallon of cherry vinegar, at 22¢ a gallon, and 3 pints of milk, at 6 cents a quart. What was her bill?

3. Amelia made 4 gallons of lemonade for a picnic. She sold it in pint glasses, at 5 cents a glass. How much did she receive for it?

4. Willis sold 9 gallons of milk at 6 cents a quart. How much did he receive for it?

5. Using a 1-gallon pail, Walter filled a barrel by pouring 31½ pailfuls into it. How many gallons are there in 2 barrels?

TABLE

1 barrel (bbl.)	=	31½	gallons (gal.)
1 gallon (gal.)	=	4	quarts (qt.)
1 quart (qt.)	=	2	pints (pt.)
1 pint (pt.)	=	4	gills (gi.)

6. From a barrel of vinegar 11½ gallons were drawn at one time and 5 gallons at another. How many gallons remained in the barrel?

7. How many 2-quart cans are needed to hold 6 gallons of maple syrup?

8. A grocer bought 10 gallons of molasses for $5 and sold it at 15 cents a quart. How much did he gain?

9. Harry's lamp burns 3 pints of oil in 2 weeks. How long will 3 gallons of oil last him?

10. To make grape jelly it takes one pound of sugar to every pint of juice. How many pounds of sugar will it take for 2 gallons of juice?

Answer all you can orally.

DRY MEASURE

1. Review pages 46, 51, and 99 as oral work.

2. Anderson shelled 50 bushels of corn a day for 6 days. How many bushels did he shell in the week? How many pecks?

3. James picked 7 pecks of tomatoes for his grandmother to can. How many quarts did he pick?

4. Archie gathered 5 bushels of apples from the ground in his father's orchard. How many pecks did he gather?

5. If he sold the apples at 30 cents a peck, how much money did he receive for them?

TABLE

1 bushel (bu.) = 4 pecks (pk.)
1 peck (pk.) = 8 quarts (qt.)
1 quart (qt.) = 2 pints (pt.)

6. A grocer buys chestnuts at 80 cents a peck and sells them at 15 cents a quart. How much does he gain on 1 peck? On 1 bushel?

7. A push-cart man pays $2 a bushel for raw peanuts. It costs him 20 cents a bushel to roast them. He sells roasted peanuts at 10 cents a pint. How much is the gain on 1 bushel? On 10 bushels?

8. How much is the gain on the 10 bushels in problem 7, if $\frac{1}{2}$ bushel spoiled before they were sold?

9. Potatoes are bought at $1 a bushel. If a grocer loses $\frac{1}{2}$ a peck in every bushel, and sells the rest at 40 cents a peck, how much does he gain on 8 bushels?

10. Cranberries cost $4 a barrel of $2\frac{1}{2}$ bushels. They are sold at 12 cents a quart. How much is the gain on 1 barrel, if none are lost in handling? How much is the gain if 8 pints are lost in handling?

1. There were 3 crews of 8 oars each in a boat race. How many men rowed in the race?

2. An ocean liner crossed the Atlantic in 8 days. How many trips of that length could it make from August first to September second?

3. In an art gallery were 32 oil paintings and $\frac{1}{4}$ as many etchings. How many etchings and paintings were in the gallery?

4. Amanda hired a pony carriage in the park at 80 cents an hour. She kept it $2\frac{1}{2}$ hours. What did she pay for it?

5. Amelia sold 4 dozen paper roses at 2 cents each. How much did she receive?

6. Add:

279	372	782	372	687
684	698	698	987	249
726	496	726	684	872
842	891	982	928	698

7. Subtract:

407	598	326	682	721
316	499	197	598	129

8. Multiply:

4872	8649	7642	8347
4	8	4	8
17563	38765	12643	6498
4	2	2	4

9. Divide:

4)7205	8)6723	4)1062	8)2046
2)13716	4)26718	8)19464	2)11356

Answer all you can orally.

1. Review pages 50 and 51 as oral work.

2. How many 2-oz. packages of cinnamon can be made from 1 lb. of cinnamon?

3. How many 4-oz. packages of ginger can be made from 5 lb. of ginger?

4. What is the cost of a 2-oz. package of pepper at 40 cents a pound?

5. How many ounces in $\frac{1}{2}$ pound? In $\frac{1}{4}$ lb.? In $\frac{1}{8}$ lb.? In $\frac{3}{4}$ lb.? In $\frac{7}{8}$ lb.?

6. What will 4 oz. salted almonds cost at 60¢ a pound?

7. What will 12 oz. caramels cost at 32 cents a pound?

8. What will 9 oz. spices cost at 48 cents a pound?

9. What will 12 oz. cheese cost at 16 cents a pound?

10. A grocer bought 25 lb. tomatoes at 3¢ a pound, sold 15 lb. at 5¢ a lb., 7 lb. at 3¢ a pound, and the rest spoiled. How much did he make on the tomatoes?

11. A dealer bought 50 lb. coffee at 26 cents a pound, He divided it into 1-lb. sacks and sold it all at 35 cents a sack. If the sacks cost $\frac{1}{5}$ of a cent apiece, how much did he make on the coffee?

12. Find the total cost of 8 lb. of candy at 35 cents a pound, and of 12 lb. of nuts at 12 cents a pound?

13. Find the total cost of this bill:

3 lb. butter at 27 cents a pound.
5 lb. honey at 18 cents a pound.
4 lb. cheese at $11\frac{1}{2}$ cents a pound.

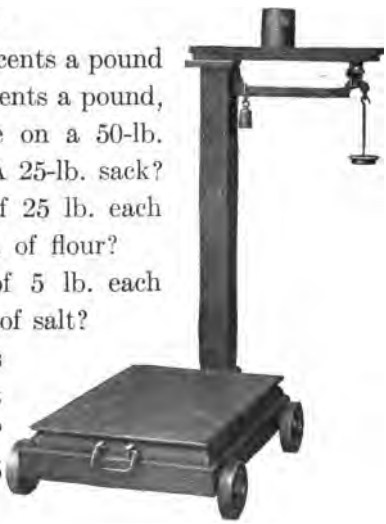
14. Find the total cost of this bill:

4 oz. cloves at 60 cents a pound.
2 oz. pepper at 48 cents a pound.
12 oz. cheese at 12 cents a pound.

1. How many 5-lb. sacks of salt can be filled from a 300-lb. barrel of salt?

2. A grocer paid \$2.40 for a 300-lb. barrel of salt and sold it out in 5-lb. sacks at 5¢ each. How much did he make?

3. If a grocer pays 2½ cents a pound for flour and sells it at 4 cents a pound, how much does he make on a 50-lb. sack? A 100-lb. sack? A 25-lb. sack?



4. How many sacks of 25 lb. each can be filled from 525 lb. of flour?

5. How many sacks of 5 lb. each can be filled from 280 lb. of salt?

6. A bushel of potatoes weighs 60 pounds. What is the weight of 6 bushels? 8 bushels? 12 bushels? 25 bushels? 36 bushels?

7. A bushel of shelled corn weighs 56 pounds. How much do 4 bushels weigh? 9 bushels? 12 bushels? 16 bushels? 28 bushels?

8. A picnic party of 5 people weighed as follows: 178 lb., 136 lb., 125 lb., 82 lb., and 64 lb. How much did the whole party weigh? What is the difference between the weights of the heaviest and the lightest persons?

9. The total weight of a party of twelve was 1200 lb. If all the members of the party were of the same weight, what was the weight of a single person (average weight)?

10. Find the average weight of a person of the party of problem 8?

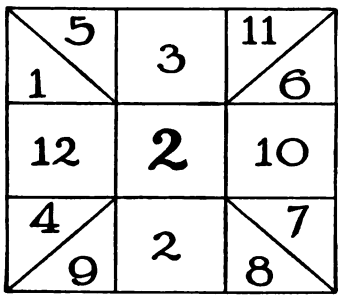


Figure A

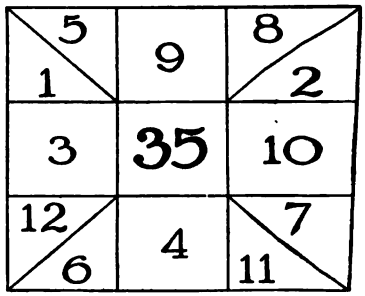


Figure B

1. Multiply each number in the outside spaces of Figure A by the center number.

2. Change the center number in Figure A to 5; 3; 7; 6; 4; 8; 9; 12; 11; 10. Each time the center number is changed, multiply all the other numbers by it.

3. Divide the center number in Figure B by each of the other numbers. When there is any remainder tell what it is.

4. Change the center number to 21; 24; 28; 36; 42; 44; 45; 48; 60; 54; 56; 64; 65; 66; 72; 81; 88; 90; 96; 100; 121; 132; 108; 144. Each time the center number is changed, divide it by each of the other numbers.

5. How many 2's in 6? 8? 10? 12? 24? 50? 56? 90? 124? 132? 144?

6. How many 3's in 9? 15? 21? 33? 39?

7. How many 4's in 8? 12? 24? 16? 32? 20?

8. How many 5's in 25? 20? 60? 45? 35?

9. How many 6's in 18? 12? 24? 42? 48? 66? 72? 54?

10. How many 7's in 35? 49? 21? 14? 63? 42? 70?

11. How many 8's in 16? 32? 48? 64? 24? 40? 56?

Find the cost of:

1. 3 dozen eggs at 18 cents a dozen.
2. 5 dozen oranges at 25 cents a dozen.
3. 4 dozen lemons at 20 cents a dozen.
4. 6 dozen bananas at 22 cents a dozen.
5. 2 dozen tablets at 9 cents a tablet.
6. 7 dozen pencils at 35 cents a dozen.
7. 8 dozen buttons at 27 cents a dozen.
8. 12 dozen candles at 10 cents a dozen.
9. 10 dozen spools of cotton at 50 cents a dozen.
10. 11 dozen spools of silk at 90 cents a dozen.
11. 15 dozen erasers at 25 cents a dozen.
12. 14 dozen pairs of scissors at $1.80 a dozen.
13. 13 dozen pairs of stockings at $1.50 a dozen.
14. 16 dozen pairs of suspenders at $1.25 a dozen.
15. 19 dozen pens at 5 cents for each pen.
16. 17 dozen bottles of ink at 3 cents a bottle.
17. 18 dozen bags of salt at 5 cents a bag.
18. 12 dozen tooth-brushes at $1.60 a dozen.
19. 10 dozen bottles tooth-powder at $1.00 a dozen.
20. 15 dozen pears at 30 cents a dozen.
21. 16 dozen loaves of bread at $.05 a loaf.
22. 19 dozen foot-rules at 1 cent apiece.
23. 14 dozen blotters at 5 cents a dozen.
24. 15 dozen pieces of dustless crayon at 10¢ a dozen.
25. 18 dozen tubes of paste at 50 cents a dozen.
26. 13 dozen bottles of glue at $1.00 a dozen.
27. 9 dozen boxes baking-powder at 15 cents a box.
28. 8 dozen jars preserved ginger at 25 cents a jar.
29. 4 dozen photo frames at 10 cents each.
30. 15 dozen papers of pins at 5 cents a paper.

1. Review pages 64 and 65 as oral work.

2. Of the school children in a certain city 3495 are boys and 2837 are girls. What is the total attendance?

3495 girls
2837 boys
6332 total

7 and 5 are 12, or 1 ten and 2 units. Write the 2 units. Then, 1 ten and 3 tens and 9 tens are 13 tens, or 1 hundred and 3 tens. Write the 3 tens.

Continue in this way until all numbers are added.

Show how the last two figures, the 6 and the 3, are found in the total. Read the total.

3. In a town there are 1676 grown persons and 2475 children. How many people are there in this town?

4. In one library there are 3528 books, and in another, 4695 books. How many in both libraries?

5. There are 5374 miles of railroad in one state and 2868 miles in another. How many miles of railroad in both states?

6. In one year a fruit grower sold 3448 boxes of berries and 3976 boxes the next year. How many boxes of berries did he sell during the two years?

7. A man bought a lot for $2350 and built a house on it which cost him $7898. What did both cost him?

8. Add:

2037	8226	4587	1284	7431	3368
4256	975	3624	7536	1869	4852
4768	3579	1928	4536	5948	6384
1359	2468	3746	2879	3726	1597
5762	3478	6712	4726	8721	6975
3498	7842	6721	3497	6829	8982

1. Four loads of coal were delivered at a residence. The first weighed 2564 pounds, the second 3148 pounds, the third 2866 pounds and the fourth 2645 pounds. What was the total weight of coal delivered?

2564 lb.
3148 lb.
2866 lb.
2645 lb.
11223 lb.

5 (and 6), **11**, (and 8), **19**, (and 4), **23**, or 2 tens and 3 units. Write 3, as shown. Then, 2 (and 4), **6**, (and 6), **12**, (and 4), **16**, (and 6), **22**. 22 tens are 2 hundreds and 2 tens. Write the 2 tens. Then, 2 (and 6), 8, (and 8), **16**, and so on.

In adding we speak only the numbers outside the ( ). Check, or test, the correctness of your addition by adding the columns from the top downward.

2. How can you prove your result in problem 1? Give a reason for proving your results.

3. A man has 5 farms: one of 160 acres, one of 88 acres, one of 275 acres, one of 96 acres and one of 324 acres. How many acres are there in the five farms?

4. There are 375 pupils in one school building, 640 in another and 583 in another. How many children are there in the three buildings?

5. Add and test your results:

1729	3546	1892	1563	2623	1089
2354	1273	4203	2427	1206	721
4162	2098	461	5314	4257	5147
1431	1754	2574	256	1714	2425
947	6126	1245	4678	6924	3987
2753	825	3256	963	728	4058
1388	1268	1367	2837	1256	874
5234	1834	2765	1234	473	1498

PROBLEMS WITH THE PUSH-CART MAN

A push-cart man has on his cart the articles given in this list at the prices named:

Gum drops, caramels, and stick candy at 2 for 1 cent;
Cracker-jack and lemon drops, at 5 cents a box;
Chewing gum at 5 cents a package;
Pop-corn and peanuts at 5 cents a bag;
Molasses candy and butter-scotch at 5 cents a package.

1. How many cents will it take to buy 4 gum-drops, 4 caramels, and 2 sticks of candy?

2. How many cents would be needed to buy:

(1) A bag of peanuts, a box of cracker-jack, and a box of lemon drops?

(2) A bag of peanuts, 2 boxes of cracker-jack, and a box of lemon drops?

(3) 10 caramels, 2 sticks of candy, and 2 packages of chewing gum?

(4) 4 boxes of cracker-jack and 2 bags of peanuts?

(5) 7 bags of pop-corn, and 5 bags of peanuts?

3. The push-cart man pays 5 cents for 2 boxes of cracker-jack, and sells it at 5 cents a box. How much does he make on 120 boxes of cracker-jack that he sold in a day?

4. He pays 2 cents a box for lemon drops and sells them at 5 cents a box. If he sells 75 boxes in one day, how much does he make on lemon drops?

5. A picnic party bought 12 bags of peanuts, 8 boxes of cracker-jack, and 5 bags of pop-corn. What was the cost of all at the prices named?

6. Margaret buys a box of cracker-jack every day of the week except Sunday. How much does she spend a week for cracker-jack?

The numbers of factories and people engaged in making bicycles and tricycles in the United States in 1890, 1900, and 1905, are shown here:

	In 1890	In 1900	In 1905
Number of factories	27	312	101
Clerks and officers	128	2034	361
Men, 16 years and over	1747	16700	3298
Women, 16 years and over	15	517	7
Children under 16 years	35	308	14

1. How many more factories were making bicycles and tricycles in 1900 than in 1890? In 1900 than in 1905? In 1905 than in 1890?

2. How many more clerks and officers were engaged in making bicycles and tricycles in 1900 than in 1890? In 1900 than in 1905? In 1905 than in 1890?

3. How many more women 16 years old, and over, worked at bicycle- and tricycle-making in 1900 than in 1890? In 1900 than in 1905? In 1890 than in 1905?

4. How many more children, under 16 years, worked in these factories in 1900 than in 1890? In 1900 than in 1905? In 1890 than in 1905?

5. How many more men, 16 years and over, worked at bicycle- and tricycle-making in 1900 than in 1890? In 1900 than in 1905? In 1905 than in 1890?

6. How many persons altogether were working in this business in 1890? In 1900? In 1905?

7. How many more persons altogether were working at this business in 1900 than in 1890? In 1900 than in 1905? In 1905 than in 1890?

8. In which year was this business the largest?

1. A man paid $2684 for a house, $398 for furniture, and $165 for a horse. How much did he pay for all?

2. A lot cost $1540, the sidewalk $116, the house $6535, the barn $975. How much did they all cost?

3. A ship sailed 134 miles the first day, 175 miles the second day, and the third day as far as in the first two. How far did it sail in the three days?

4. Three vessels are loaded with copper ore. The first carries 347 tons, the second 1256 tons, the third 4384 tons. How many tons do they all carry?

5. From Detroit to Buffalo it is 251 miles; from Buffalo to New York City 410 miles; from New York City to Washington, D. C., 228 miles. How far is it from Detroit to New York City? From Detroit to Washington by way of New York City?

6. From Burlington to Omaha it is 296 miles; from Omaha to Lincoln 39 miles; from Lincoln to Denver, 484 miles. How far is it from Burlington to Lincoln? From Burlington to Denver?

7. From Milwaukee to La Crosse it is 281 miles; from La Crosse to St. Paul, 131 miles; from St. Paul to Minneapolis, 10 miles. How far is it from Milwaukee to Minneapolis?

8. From Omaha to Cheyenne is 516 miles; from Cheyenne to Ogden, 484 miles; from Ogden to Sacramento, 743 miles. How far is it from Omaha to Sacramento?

9. How far is it from your home town to the capital of your state? From your home town to Washington, D. C.? From your home town to San Francisco?

10. Using the distances found in railway time tables, make and solve problems like those above.

1. A man has 156 books in one case, 275 in another, and in a third 145 more than in both of the others. How many books has he in the 3 cases?

2. A factory made 540 bicycles in January; 375 in February; 643 in March, and 856 in April. How many did it make in the 4 months?

3. A man delivered 4 loads of coal. In the first were 2150 pounds; in the second, 1975 pounds; in the third, 2260 pounds, and in the fourth, 2315 pounds. How many pounds were delivered in the 4 loads?

4. A carpenter was paid \$1375.50 for building one house; \$3240.75 for another; \$1658.50 for a third. How much did he receive for building the 3 houses?

5. The cash sales of a certain merchant were on Monday, \$253.25; Tuesday, \$167.54; Wednesday, \$365.80; Thursday, \$453.65; Friday, \$385.42, and on Saturday, \$563.85. What were the cash sales for the week?

6. A man bought a lot for \$2154. He paid \$453 for grading and digging a cellar, and \$165.40 for a sidewalk. He built a house to cost the same amount that he had spent for the lot and all improvements. How much did he invest in the lot and house?

7. A man's salary was \$2300 a year. He also received \$135 interest, \$426 rents, and from all other sources a sum equal to these three amounts. What was his annual income?

8. The yield from one field of wheat was 275 bushels; from a second, $562\frac{1}{2}$ bushels; from a third, 458 bushels, and from a fourth, $346\frac{1}{2}$ bushels. What was the entire yield from the 4 fields?

9. 416 ft., 6 in. + 375 ft. + 456 ft., 6 in. = ?

FUDGES	NUT CANDY
3 cups granulated sugar (1½ lb.)	1 cup granulated sugar (½ lb.)
1¼ cups milk (¾ pint)	2 cups brown sugar (1 lb.)
1 two-inch square of chocolate (3c)	Butter the size of a walnut (1c)
Butter the size of a walnut (1c)	½ cup cream (¼ pint)
(Allow ½c for fuel)	½ lb. shelled English walnuts
	(Allow 1c for fuel)

1. Find the cost of the fudges, counting the sugar at 6¢ a pound; the milk at 2¢ for ¾ pt.; the chocolate, butter, and fuel as in the rule. This will make 3 dozen fudges.

2. Jessie and Ethel made fudges, using this rule. They sold the fudges at 1¢ each. How much did they receive?

3. Marion used double this fudge rule at Christmas time. How many fudges did she make. How much did they cost her?

4. If fudges were made by this rule and sold at 15¢ a dozen, what would be the gain?

5. Find the cost of the nut candy, counting the granulated sugar at 6¢ a pound; the brown sugar at 4¢ a pound; the cream at 20¢ a pint; the shelled English walnuts at 60¢ a pound, and the butter and fuel as given in the rule.

6. This rule makes 5 dozen thick squares of nut candy. If they sell at 2¢ a square, what is the gain on the whole?

7. Edwin made 3 times the nut candy rule. What was the cost? He sold the squares at 15¢ a dozen. How much did he receive for them? What was his gain?

8. Lena wanted to earn some Christmas money. She made twice the nut candy rule and 3 times the fudge rule. What did it cost her? She sold all the fudges at 2¢ each. How much did she receive for them? How much did she gain? She sold all the nut candy at 2¢ a square. How much did she receive for it? How much did she gain?

PRICES OF FURNITURE

Metal bedstead	$18.00	Refrigerator	$ 9.65
Dresser	14.00	Bedroom stand	4.00
Wash-stand	8.00	Dressing-table	10.50
Common rocker	5.50	Shaving-stand	15.00
Davenport	55.00	Hall chair	3.00
Bookcase	15.00	Stiff-backed chair	3.00
Small desk	12.50	Arm-chair	6.50
Combination desk and bookcase	33.00	Foot rest	2.50
Morris chair	15.00	Large desk	50.00
Quarter-sawed oak dining-table	29.75	Wicker rocker	4.00
Dining-room chair	3.95	Polished-top stand	12.50
Kitchen table	3.00	Sideboard	45.00
		Small range	25.00
		Spice chest	1.00

1. At the prices given in this list, what is the cost of furnishing a kitchen with a small range, a kitchen table, a refrigerator, and a spice chest?

2. Find the cost of a quarter-sawed oak dining-table, a sideboard, and 6 dining-room chairs.

3. Find the cost of furnishing a room with a metal bedstead, a dresser, a washstand, a polished-top stand, a stiff-backed chair, and 2 common rockers.

4. Find the cost of furnishing a room with a metal bedstead, a shaving-stand, a dresser, a bedroom stand, a rocker, a stiff-backed chair, and a foot rest.

5. Find the cost of a metal bedstead, a dressing-table, a small desk, a rocker, and a stiff-backed chair.

6. Find the cost of furnishing for a living-room a davenport, a Morris chair, 2 wicker rockers, 2 common rockers, 2 stiff-backed chairs, a foot rest, a bookcase, a large desk, and a polished-top stand.

7. Find the cost of 2 metal bedsteads, 2 dressers, a shaving-stand, a dressing-table, and 4 common rockers.

8. Find the cost of furnishing a room as you wish.

1. A horse traveled 7 miles an hour the first hour of a journey, 6 miles an hour the next 2 hours, and 5 miles an hour the next 5 hours. How many hours did he travel? How far did he travel in that time?

2. A man walked 4 miles an hour for 3 hours, 5 miles the next hour, and 3 miles an hour the next two hours. How many hours did he travel? How far did he travel?

3. In an automobile race one of the racers went 90 miles an hour for 6 hours, and 95 miles an hour for 6 hours. What distance did he go in the 12 hours?

4. A grizzly bear traveled 11 miles 1 day, twice as far the next day, one-half as far the third day as the second. How far did he travel in the 3 days?

5. A boy rode on his bicycle 10 miles the first hour, the same distance and 5 miles more the second hour, which was three-fourths of what he rode the third hour. How far did he ride the second hour? The third? Altogether?

6. A train made the following runs: The first hour 28 miles; the second hour 8 miles farther than the first; the third hour two-thirds as far as the second, and the fourth hour 40 miles. How far did it run the second hour? The third? In the 4 hours?

7. In a factory there are 28 persons working on the first floor, $\frac{1}{2}$ that number on the second, 4 times as many on the third as on the first floor, $\frac{1}{2}$ as many on the fourth as on the third, and 30 on the fifth floor. Make a list of the number of persons on each floor. How many persons on the 5 floors?

8. In a library there are 78 science books, $\frac{1}{2}$ as many histories, and 3 times as many story books as science books. How many books are in the library?

1. Joseph paid $18 for a spring suit, two-thirds as much for an overcoat, one-ninth as much for a hat as for the suit, and one-sixth as much for 2 shirts as for the suit. How much did the overcoat cost? The hat? The 2 shirts? How much money did he spend in all?

2. Alice paid $12 for a new coat, one-half as much for a skirt, one-third as much for a hat as for the coat, one-fourth as much for a pair of shoes as for the coat, and one-third as much as the shoes cost for a new pair of gloves. How much did the skirt cost? The hat? The shoes? The gloves? How much did Alice spend in all?

3. Julian spent 20 cents for shoe-polish, one-fourth of a dollar for a tooth-brush, three-fourths as much for soap as for polish, and twice as much for a hair-brush as for a tooth-brush. How much did the tooth-brush cost? The soap? The shoe-polish? The hair-brush? How much did Julian spend in all?

4. Andrew bought a leather cap for 50 cents, a fishing-rod for one-half as much, a pair of rubber boots for 4 times as much as for the cap, a fish-basket for 3 times as much as the cap cost, and a can of bait for 15 cents. How much did the fishing-rod cost? The rubber boots? The fish-basket? How much money did he spend altogether?

5. Make out and foot the bill for the following:

5 packages of petunia seed at 5¢ a package;
2 packages of giant pansy seed at 20¢ a package;
$\frac{1}{2}$ pound of nasturtium seed at 10¢ an ounce;
$1\frac{1}{2}$ ounces of canary bird vine seed at 14¢ an ounce;
4 packages of aster seed at 10¢ a package;
3 packages of sweet-william seed at 8¢ a package;
6 packages of columbine seed at 10¢ a package.

FURNISHING A DOLL-HOUSE

Any one of the following articles for furnishing doll-houses may be bought for 10 cents, or 15 cents, or for 25 cents, according to size and quality:

Bedstead	Cuckoo clock	Kitchen cabinet
Table	Picture	Couch
Chair	Bowl and pitcher	Fur rug
Mirror	Dresser	Candlestick
Stand	Set of dishes	Carpet

1. Hazel's doll-house has a parlor, a sitting-room, a kitchen, and three bed-rooms upstairs. Her brother bought for the parlor a 25-cent carpet, a 15-cent table, a 15-cent candlestick, a 25-cent cuckoo clock, and 3 chairs at 10 cents each. What was the cost of all?

2. Her mother bought for the sitting-room 3 pictures at 10 cents each, a couch at 25 cents, a small table at 15 cents, 4 chairs at 10 cents each, and 2 fur rugs at 15 cents each. What was the cost of all?

3. Her sister bought for the kitchen a table at 25 cents, a kitchen cabinet at 25 cents, a mirror for 15 cents, a set of dishes at 15 cents, 6 chairs at 10 cents each, and a small table at 10 cents. Find the cost of all.

4. Her father bought for the bed-rooms 3 beds at 25 cents each, 6 chairs at 10 cents each, 3 dressers at 25 cents each, 3 mirrors at 15 cents each, 6 pictures at 10 cents each, 3 wash-bowls and pitchers, a bowl and pitcher together costing 25 cents, and 6 fur rugs at 15 cents each. Find the total cost of the bed-room furniture.

5. Hazel bought a yard of denim for carpets at 25 cents, and 15 cents' worth of Swiss for curtains, 5 little dolls at 15 cents each and a doll carriage for 95 cents. How much did Hazel pay for all?

1. How much in all did Hazel's brother, mother, sister, father, and Hazel herself spend on furnishing the doll-house?

2. The cost of the doll-house itself was 375 cents. How much money was spent for the house and its furnishings?

3. If Hazel's brother had saved $\frac{1}{5}$ of the cost of all, including the cost of the house itself, by making as much of the house and furniture as he could, how much would he have saved?

4. What would be the cost of each of the articles in the first column on the opposite page at 15¢ apiece?

5. A toy-dealer bought the articles of the first column in large quantities, at 8 cents apiece and sold them at 15 cents apiece. How much did he gain on 5 of each of these articles? On 8 of each? On 10? On 12?

6. The dealer paid 60 cents a dozen for a dozen of each of the articles of column 2. How much did he pay for them?

7. He sold 10 cuckoo clocks, at 15 cents each, 11 pictures at 12 cents each, and all 12 of each of the last 3 articles at 15 cents each. How much did he gain on all?

8. A dealer bought a dozen of each article of column 1, at 12 cents each, 10 of each article of column 2, at 10 cents each, and 9 of each article of column 3, at 8 cents each. How much did he pay for all?

9. He sold the articles of column 1 at 25 cents each, 9 of those of column 2 at 20 cents each, and 8 of those of column 3 at 15 cents each. How much did he receive for all? The rest were broken and he did not sell them. How much did he gain on all that he sold?

1. Review pages 69 and 70.

2. A carriage cost $425; a horse $246. How much more did the carriage cost than the horse?

From $425	6 from 15 leaves what?
take $246	4 from 11 leaves what?
$???	2 from 3 leaves what?

3. The walls and ceilings of one room contain 444 square feet; those of a second room contain 159 square feet less. How many square feet in the second room?

From 444 sq. ft.	Explain how each figure of
take 159 sq. ft.	the difference is found.
??? sq. ft.	Prove the result correct.

4. A man's salary is $2650 a year; if his expenses for the same time are $2075, how much does he save in one year? Test by adding.

5. One ship sails 645 miles in 3 days. Another sails 712 miles in the same time. How much farther does the second sail than the first? At the same rate how much farther would it sail in one day? In 9 days?

6. 223 − 144 = ?	**12.** 975 − 887 = ?
7. 201 − 178 = ?	**13.** 274 − 187 = ?
8. 542 − 263 = ?	**14.** 902 − 873 = ?
9. 831 − 548 = ?	**15.** 777 − 188 = ?
10. 362 − 279 = ?	**16.** 864 − 579 = ?
11. 666 − 177 = ?	**17.** 743 − 654 = ?

18. On Tuesday a merchant placed in the bank $465. On Saturday he drew out $278. How much did he still have in the bank? Test.

19. At an election the successful candidate received 913 votes, and the unsuccessful candidate 658 votes. Find the majority of the former. Test.

1. Subtract 4586 from 6352.

From $\overset{5,12,14,12}{6352}$
Subtract 4586

The small numbers written above the figures of 6352 show how to think 6352 into parts to subtract 4586 from it. The numbers mean that 52 = 40 + 12. Then, 34 = 20 + 14, and 62 = 50 + 12.

2. From $\overset{6,12,16,14}{7374}$
Subtract 4687
2687

Tell where the 14 above the 4 comes from; the 16 above the 7; the 12; the 6.

3. Solve the following exercises:

Subtract:

(1)	(2)	(3)	(4)	(5)	(6)
4352	6234	8032	9457	5321	3324
2676	4395	5786	3869	3867	2657
(7)	(8)	(9)	(10)	(11)	(12)
8967	8241	7241	7294	7182	9256
3429	3819	398	5076	3647	7598
(13)	(14)	(15)	(16)	(17)	(18)
7586	6493	4250	8593	5721	5345
3242	4729	2575	7279	3809	2675
(19)	(20)	(21)	(22)	(23)	(24)
4792	6820	8901	7002	6840	7080
3489	5761	6820	6111	3471	4121
(25)	(26)	(27)	(28)	(29)	(30)
4062	5610	7500	6111	7004	5002
2608	3164	5262	3248	3206	2060

1. A tank that holds 3324 gallons lacks 1576 gallons of being full. How many gallons does it contain?

From 3324, *minuend,*
take 1576, *subtrahend.*
1748, *difference,* or *remainder.*

Explain how each figure of the difference is found.

2. One year a grocer sold 17,206 dozen eggs and the next year 21,119 dozen. How many more dozens did he sell the second year than the first?

3. Find the unknown number and test.

	Minuend.	Subtrahend.	Difference or Remainder.
(1)	3211	2933	?
(2)	7235	6856	?
(3)	?	5945	869
(4)	85004	25687	?
(5)	?	91617	76928

4. During the year 1897, 2321 immigrants went to live in Louisiana and 1872 went to live in Texas. How many more went to Louisiana than to Texas?

5. The battleship New York takes the place of 8200 tons of water when it is afloat, the battleship Texas, of 6315 tons. How much more water does one ship displace than the other?

6. The coast line of North America is 24,040 miles; that of South America, 13,600 miles; and that of Europe, 17,200 miles. How many more miles of coast line has North America than South America? North America than Europe? Europe than South America?

7. In 1896, 6511 horses were brought into this country from British North America; in 1897, 4777. How many more were brought in in 1896 than in 1897?

1. From a farm containing 1100 acres, the owner sold 894 acres. How many acres had he left?

2. The area of Virginia is 42,450 square miles; of Pennsylvania, 45,215 square miles. Which is the larger? How much?

3. A farm cost $3215. The buildings cost $627 less than the farm. How much did the buildings cost?

4. Subtract and test the results:

(1)	(2)	(3)	(4)	(5)	(6)
4352	8132	9457	5321	6234	9257
2672	5786	3869	1867	1395	6389
(7)	(8)	(9)	(10)	(11)	(12)
3324	7563	7241	9256	8200	2354
1657	2786	2398	7498	6712	1876
(13)	(14)	(15)	(16)	(17)	(18)
4250	4060	3006	4523	3132	7345
1575	2099	2217	2657	1854	5868
(19)	(20)	(21)	(22)	(23)	(24)
6352	9374	7374	5432	8513	5345
4576	4687	4687	1845	6729	2678

5. One railroad has 5214 miles of track; another has 2767 miles of track. How much more track has the first than the second?

6. A man's income one year was $1985 and the next year it was $2140. How much greater was his income the second year?

7. Two vessels start from the same point at the same time and in the same direction. One travels 829 miles while the other travels 1014 miles. How far are they apart?

1. A slow river flows 15,840 feet an hour. A rapid river flows 36,960 feet in an hour. What is the difference in the distances covered by the two in one hour?

2. A carriage was bought for $325, a horse for $175, and a sleigh for $150. A payment of $125 was made on the carriage, a payment of $112 on the horse, and a payment of $56 on the sleigh. How much remained to be paid on the carriage? The horse? The sleigh? On all?

3. Subtract:

(1)	(2)	(3)	(4)	(5)
4726	8092	8294	6826	4072
3987	7963	7982	5982	3987
(6)	(7)	(8)	(9)	(10)
67829	68750	83607	96702	89020
39879	58792	59879	69892	84948
(11)	(12)	(13)	(14)	(15)
67000	82020	80980	71000	10101
59811	72919	25751	36987	9899

4. From the beginning of the Mississippi River to the Gulf of Mexico the water travels 4200 miles. The Amazon River is 3600 miles long. How much longer is the Mississippi than the Amazon?

5. One car contains 35,352 pounds of coal, another contains 26,475 pounds. How much more does the first contain than the second?

6. How many persons are there in the capital city of your state? How many persons in the capital city of some adjoining state? Find the difference in the population (number of persons) of these two states.

Answer all you can orally.

1. Ellen earned 90 cents and spent 35 cents and a dime. How much had she left?

2. Edward bought a $1.35 football and gave the clerk a 2-dollar bill. How much change did he receive?

3. Mary's mother gave her 85 cents. She bought a 10-cent tablet and a 25-cent book-cover. How much money had she left?

4. Fred received $1.27 selling papers which cost him $.92. How much did he gain?

5. A picture was bought for $92.50 and sold for $125.00. How much did the owner gain?

6. Butter was selling at 42 cents, but was reduced in price 7 cents a pound. What was then the selling price?

7. A cow was bought for $47 and sold for $34. What was the loss?

8. A man's wages were raised from $1.25 to $1.85 a day. What was the gain in 1 day? In 1 week of 6 days?

9. What was the gain of this man in 4 weeks? What was the gain in 9 weeks?

10. His expenses were $1.00 per day. How much could he save a day after his advance? In 4 weeks?

11. From a field containing 78 sheep, 14 were taken at one time, 10 at another, and twice 9 at another. How many sheep were left in the field?

12. A boy was given $5 for car-fare for 3 months. The first month his car-fare amounted to 99 cents, the second month to $1.05, and the third month to $2.07. How much had he left of the $5?

13. Out of 107 rose bushes set out, 18 died, and 29 were pulled up. How many were left to grow?

1. Review page 73.

2. If a man earns 27 cents an hour, how much will he earn in a ten-hour day?

3. How many fingers and thumbs are there on four dozen pairs of gloves?

4. Multiply each of the following numbers by 10; by 100: 4, 6, 8, 10, 3, 9, 7, 5, 11, 14, 25, 73, 243, 649.

How may we quickly multiply a whole number by 10? By 100?

5. One spool of darning cotton contains 45 yards.

45 yd. How many yards will 30 spools contain?

30 30 times 45 yards equals how many

1350 yd. times 10 times 45 yards?

How may we quickly multiply any number by another number ending in zero?

6. What is the cost of 900 bushels of oats at 36 cents a bushel?

7. Multiply:

84	96	75	68	237	485	379
20	30	40	50	60	70	80
37	49	54	124	272	234	563
200	300	400	500	600	700	800

8. What will 40 tons of hay cost at $18 a ton?

9. A bushel of wheat weighs 60 pounds. What is the weight of 231 bushels?

10. If a train goes at the rate of 40 miles an hour, how far will it go in 24 hours?

11. How many times will a clock strike in 30 days, if it strikes 156 times each day?

12. How many ounces are there in 40 pounds?

1. A garden is 53 feet long and 24 feet wide. How many square feet does it contain?

Multiplicand,	53 sq. ft.	Why do we call the *multiplicand* square feet?
Multiplier,	24	What does the *multiplier* tell?
	212	4 times 53 square feet = ?
	1060	20 times 53 square feet = ?
Product,	1272 sq. ft.	24 times 53 square feet = ?

2. What is the cost of 72 bushels of corn at 47¢ a bushel?

3. A ship can sail 225 miles a day in fair weather, and 160 miles a day in stormy weather. How many miles can it sail in 27 days if 13 of these days are stormy?

4. School is in session 6 hours a day. How many hours is it in session during 26 weeks of 5 days each?

5. There are 38 rows of trees in an orchard, each containing 95 trees. How many trees are there in the orchard?

6. There are 37 kegs of nails, each weighing 100 pounds. Each keg, when empty, weighs 8 pounds. Find the weight of the nails without the kegs.

7. Compare the product of 27 times 54 with that of 54 times 27. How can you test the correctness of your work in multiplication?

8. Solve:

Multiplicand,	47	89	68	85	78	92
Multiplier,	14	15	16	17	18	19
Product,						

9. Multiply and test the correctness of each result:

67	35	56	76	145	476	398	714
23	32	43	53	37	27	57	83

1. A merchant buys 4 dozen pairs of shoes at $2.25 per pair. How much did they cost?

2. A boy reads a book of 316 pages every 2 weeks during the year. How many pages does he read in the year?

3. There are 189 teachers in the schools of a city. Each one has 49 scholars enrolled. How many scholars are enrolled in the city?

4. A lot is 195 feet long and 53 feet wide. How many square feet does it contain?

5. A train runs 37 miles in an hour. How far will it run in two days at the same rate?

6. A merchant bought 149 rolls of carpet. Each roll contained 68 yards. How many yards of carpet did he buy?

7. There are 8 cars an hour on a street car line, and each carries 36 persons. How many persons ride on the road from 6 o'clock in the morning until 6 in the evening?

8. A conductor collected 27 5-cent fares, and 6 3-cent fares a trip for 9 trips. How much money did he collect?

9. A boy gets $3.75 a week and spends 79¢ each week. How much money will he have at the end of 18 weeks at the same rate?

10. A boy sells 29 papers each day 6 days in a week. How many papers does he sell in a year?

11. If there are 17 apples in half a peck, how many apples are there of the same size in 13 bushels?

12. A miller bought 118 bushels of wheat at 78¢ a bushel. How much did it cost him?

13. A boy makes up a club of 17 subscribers for Harper's Young People at $1.65 each. How much money should he collect?

What is the cost of;

1. 138 pounds of creamery butter at 18¢ a pound.
2. 215 pounds of dairy butter at 17¢ a pound.
3. 348 dozen strictly fresh eggs at 9½¢ a dozen.
4. 48 bushels of new potatoes at 85¢ a bushel.
5. 464 pounds of turkeys at 8½¢ a pound.
6. 378 pounds of chickens at 9¢ a pound.
7. 17 barrels of choice apples at $3.25 a barrel.
8. 29 barrels of common apples at $2.35 a barrel.
9. 67 bunches of bananas at 78¢ a bunch.
10. 29 boxes of lemons at $2.75 a box.
11. 19 boxes of California oranges at $1.95 a box.
12. 13 crates of pineapples at $3.75 a crate.
13. 23 crates of tomatoes at $2.35 a crate.
14. 17 barrels of sweet potatoes at $3.75 a barrel.
15. 378 pounds of white sugar at 4½¢ a pound.
16. 456 pounds of yellow sugar at 4¢ a pound.
17. 17 bags of coffee at $5.83 per bag.
18. 14 tons of timothy hay at $9.50 a ton.
19. 275 bushels of barley at 43¢ a bushel.
20. 58 bushels of No. 1 wheat at $1.05 a bushel.
21. 65 bushels of No. 2 wheat at 98¢ a bushel.
22. 165 bushels of No. 1 corn at 42¢ a bushel.
23. 235 bushels of No. 2 corn at 39¢ a bushel.
24. 256 bushels of white oats at 34½¢ a bushel.
25. 27 bales of cotton at $6.34 a bale.
26. 47 barrels of flour at $6.50 a barrel.
27. 39 bags of bran at $1.35 a bag.
28. 464 pounds of corn meal at 1¼¢ a pound.

NOTE.—These problems may be varied by taking the market quotations in the newspapers and substituting the prices quoted for those given in the problems.

A LIST OF PRICES IN A CANDY STORE

	Per lb.	2-lb. Box	5-lb. Box
1. Chocolate creams	$0.35	$0.60	$1.55
2. Cream-dipped Brazil nuts	.60	1.15	2.90
3. Caramels	.30	.60	1.50
4. Peppermint pats	.28	.50	1.28
5. Chocolate pats	.32	.60	1.50
6. Maple creams	.40	.80	2.00
7. Fudge	.25	.50	1.25
8. Nut candy	.30	.60	1.50
9. Paste	.60	1.20	2.80
10. Chocolate-dipped almonds	.50	1.00	2.45
11. Chocolate-dipped pecans	.50	1.00	2.45

1. Which is the cheaper, to buy 2 1-pound boxes of peppermint pats, or 1 2-pound box? How much?

2. How much more does 2 1-pound boxes of cream-dipped Brazils cost than one 2-pound box?

3. Which is the cheaper, and how much, to buy a 2-pound box of chocolate creams, or 2 1-pound boxes?

4. What is the difference in cost between 5 pounds of chocolate creams, bought at different times, and a 5-pound lot?

5. What is the difference in cost between 5 pounds of cream-dipped Brazils, bought at different times, and a single 5-pound purchase?

6. Which costs the more, and how much more, to buy 5 pounds of chocolate pats, or to buy two 2-pound boxes and a separate pound?

7. Which costs the more, and how much more, 3 pounds of fudge or 3 pounds of peppermint pats?

8. How could you buy the following for the least money: 7 lb. of chocolate creams? 4 lb. of paste? 6lb. of caramels? 7 lb. of cream-dipped Brazil nuts?

Solve orally whenever possible.

1. At 11¢ a pound, what will a 3-pound chicken cost?

2. At 18¢ a dozen, what will 2 dozen eggs cost?

3. At 15¢ a jar, what will 5 jars of imperial cheese cost?

4. At 41¢ each, what will 3 woodcocks cost?

5. At 98¢ per bu., what will 2 bu. of hickory nuts cost?

6. At $1.10 per bu., what will 5 bu. of onions cost?

7. At $8.00 a box, what will 5 boxes of string beans cost?

8. At $1.75 a bunch, 2 bunches of jumbo bananas cost how much?

9. At 29¢ a lb., what will 3 lb. of dairy butter cost?

10. At 35¢ a lb., what will 3 lb. of creamery butter cost?

11. At $6.50 a barrel, what will 2 barrels of Cape Cod cranberries cost?

12. At $9 a keg, what will 9 kegs of Malaga grapes cost?

13. At $3 per case, what will 15 cases red spanish pineapples cost?

14. At 35¢ a dozen, what will 3 dozen lemons cost?

15. At 25¢ a jar, what will 9 jars of preserved ginger cost?

16. At a Saturday market sale a lady bought the following:

2 roast chickens at $1.00 each.

4 half-pint glasses of cooked cranberries at 5¢ a glass.

2 dozen tea-biscuit at 10¢ per dozen.

2 pounds of macaroons at 40¢ per pound.

What was her bill?

17. Traveling 78 miles a day, how long will it take a man to make a trip of 25,350 miles? How many weeks, and how many days over, will that be?

1. Review pages 79 and 80.

2. A boy who had 370 pennies in his bank, exchanged them for dimes. How many dimes did he receive?

$10¢)\overline{370¢}$
$?$

How many tens are there in the dividend (370¢)? In the divisor (10¢?) What is the quotient (answer)?

3. How many weeks will it take a man to earn $860 at $20 a week?

$\$20)\overline{\$860}$
$?$

How many tens are there in the dividend? How many tens are there in the divisor? What is the quotient?

4. A grain merchant sells 300 bushels of grain a day. How long will it take him to sell 74,700 bushels?

$300)\overline{74700}$
$?$

The *number* of hundreds of bushels in the dividend divided by the *number* of hundreds of bushels in the divisor equals what?

5. Divide 20, 30, 40, 60, 90, 70, 80, each by 10. What is a short way to divide by 10 when the dividend ends in zero?

Divide 250, 520, 750, 640, 980, 370, each by 10.

6. Divide 400, 900, 800, 500, 300, each by 100. In such cases what is a short way to divide by 100?

Divide 7500, 8900, 2400, 6400, 3700, each by 100.

7. Divide 7000, 9000, 2000, 8000, each by 1000. In such cases what is a short way to divide by 1000?

Divide 75,000, 26,000, 367,000, 845,000, each by 1000.

8. Solve:

$480 \div 30 = ?$	$3600 \div 120 = ?$	$16000 \div 2000 = ?$
$720 \div 40 = ?$	$2700 \div 900 = ?$	$21000 \div 7000 = ?$
$540 \div 60 = ?$	$6300 \div 700 = ?$	$60000 \div 1200 = ?$

1. A steamboat goes at the rate of 21 miles an hour. How long will it take it to go 252 miles?

$$\begin{array}{r} 12 \\ 21\overline{)252} \\ \underline{210} = 21 \times 10 \\ 42 \\ \underline{42} = 21 \times 2 \end{array}$$

How many times is 21 contained in 25 tens? 21 tens is subtracted from 252. How many times is 21 contained in the remainder?

$252 \div 21 = 12$. Prove by multiplying 21 by 12.

2. Solve: $21\overline{)462}$ $21\overline{)672}$ $21\overline{)294}$ $22\overline{)264}$ $22\overline{)484}$

3. An orchard contains 768 trees. If there are 32 equal rows of trees, how many trees are there in each row?

$$\begin{array}{r} 24 \\ 32\overline{)768} \\ \underline{64} \\ 128 \\ \underline{128} \end{array}$$

How many times is 32 contained in 76 tens? 32 times 2 tens is subtracted from 768. How many times is 32 contained in the remainder?

$768 \div 32 = 24$. Prove it.

4. Solve and prove:

$21\overline{)420}$	$32\overline{)960}$	$43\overline{)8600}$	$53\overline{)10600}$	$64\overline{)1280}$
$82\overline{)1640}$	$63\overline{)1890}$	$72\overline{)2160}$	$91\overline{)18200}$	$83\overline{)2490}$
$73\overline{)1533}$	$42\overline{)4620}$	$52\overline{)3848}$	$71\overline{)4260}$	$91\overline{)4732}$

5. Solve and prove:

$756 \div 42 = ?$	$1118 \div 43 = ?$	$1368 \div 72 = ?$
$992 \div 62 = ?$	$1196 \div 92 = ?$	$1953 \div 93 = ?$
$884 \div 52 = ?$	$1512 \div 63 = ?$	$1325 \div 53 = ?$
$768 \div 24 = ?$	$4884 \div 44 = ?$	$2954 \div 14 = ?$
$946 \div 22 = ?$	$1148 \div 82 = ?$	$1360 \div 34 = ?$

1. 1955 pounds of coal were put into 23 bags holding equal weights. How many pounds were in each bag?

LONG DIVISION

$$\begin{array}{r} 85 \\ 23\overline{)1955} \\ 184 \\ \hline 115 \\ 115 \\ \hline 0 \end{array}$$

quotient. *dividend.* *remainder.*

First find how many times 23 goes in 195 thus: 2 in 19, 9 times. But $9\times 23=207$. 207 is larger than 195. We now decide 23 goes only 8 times in 195.

Subtract 8×23 ($=184$) from 195, getting 11. Annex the next figure (5) of the dividend. Then 2 in 11, 5 times. $5\times 23=115$. Subtracting, find the remainder 0. This means 23 goes exactly 85 times in 1955. Answer, 85 pounds.

2. The area of Maryland is nearly 12,216 square miles. About how large would one of its 24 counties be, if all were of the same size?

3. If each box holds 29 pencils, how many boxes are needed to hold 1218 pencils?

$$\begin{array}{r} 42 \\ 29\overline{)1218} \\ 116 \quad =29\times ? \\ \hline 58 \\ 58 =29\times ? \end{array}$$

29 being nearly 30, use 30 as a *trial divisor.*

4. Divide and prove:

$24\overline{)912}$	$27\overline{)1161}$	$34\overline{)1564}$	$38\overline{)1824}$	$46\overline{)1702}$
$37\overline{)1591}$	$48\overline{)1728}$	$59\overline{)1534}$	$49\overline{)1715}$	$67\overline{)2278}$
$53\overline{)1378}$	$57\overline{)1881}$	$58\overline{)2668}$	$62\overline{)1736}$	$66\overline{)3168}$
$68\overline{)3672}$	$74\overline{)4144}$	$79\overline{)4819}$	$83\overline{)5312}$	$87\overline{)4872}$

1. A boy sells 98 penny papers a day that cost one-half cent apiece. How many days will it take him to clear $12.74?

2. A ton of coal occupies a space of 35 cubic feet. How many tons will a car hold whose capacity is 840 cubic feet?

3. The cost of a cement sidewalk, 7 ft. wide and 50 ft. long, was $49. How much did it cost per square feet?

4. A rectangular pane of glass 19 in. wide contains 665 sq. in. How long is it?

5. It cost $31.20 to lay an oak floor at 16 cents a square foot. How many square feet did the floor contain?

6. A vineyard contained 306 grapevines, planted in rows. Each row contained 18 vines. How many rows were there?

7. A farmer sold a number of cattle at an average of $59 a head, receiving $4248. How many head of cattle did he sell?

8. How many spaces of 330 ft. are there in a mile?

9. At 75 cents per 1000 cubic feet of gas, how many thousand cu. ft. must a man have burned whose gas bill was $35.25?

10. 2808 pencils were distributed equally among 9 schools. Each school distributed its share equally among 13 of its rooms. How many pencils did each room receive?

11. Write problems based on the following facts:

	Dividend.	Divisor.	Quotient.
(1)	1843 men.	97 men.	?
(2)	3717 sq. in.	?	63 inches.
(3)	2376 books	88 books.	?

1. To send a money order of $60 costs 20 cents. How many such orders could be sent for $4.00?

2. A Mark (German money) equals about 24 cents in United States money. How many Marks make $5.52? $6.96? $11.28?

3. It costs $23 to make a trip from New York to Chicago. At that rate, how many persons could go from New York to Chicago for $575?

4. A man spent $900 in buying equal amounts of coal for 45 families. How many dollars were spent for each family?

5. 1536 acres of land were divided equally among 32 farmers. How many acres did each one get?

6. 2400 selected apples were packed in 32 baskets of equal size. How many were packed in a basket?

7. 1092 books were put on 42 shelves, the same number on each shelf. How many books were on a shelf?

8. At 60 cents each, how many footballs will $7.20 buy?

9. In a block containing 21 houses, a girl counted 315 windows. If each house had the same number, how many windows were there in a house?

10. A hall containing 768 square feet was 24 feet wide. How long was it?

11. At 15 cents each, how many shirt waists can be laundered for $3.00?

12. At 22 cents an hour, in how many hours will a man earn $5.28?

13. A granite block containing 60 cubic feet is 4 feet long and 3 feet wide. How high is it?

14. How many dozen pineapples, at 84 cents a dozen, can be bought for $12.60?

Answer all you can orally.

1. At 80¢ a gallon, what is the value of one quart?

2. 8 gallons of syrup cost $12.80. What does 1 gallon cost? One pint?

3. A boy in school for 7 years and 4 months studies history during one-eighth of the time. How many months does he study history?

4. A man pays $50 a month for rent, and $\frac{1}{5}$ as much for gas. How much does he pay for both?

5. A grocer sold 6 pounds of tea for $4.80. How much a pound did he get for it? How much an ounce?

6. A person bought land for $4576. He sold it for $\frac{1}{11}$ more than it cost. For how much did he sell it?

7. How many cans holding 5 pounds each may be filled from 2 hundredweights of coffee?

8. A girl divided one-third of 195 nuts equally among 5 friends. How many did each receive?

9. How many feet long is a platform 720 inches long?

10. In a fire a man lost one-twelfth of his goods, which were valued at $9876. How many dollars worth of goods did he lose?

11. A farmer owning 1272 acres of land divided it into 2 equal parts. One of these parts he again divided into 3 equal parts, giving one of the latter parts to each of his 3 sons, and keeping the rest himself. How many acres had he left? How many acres had each son?

12. A book case, of 7 shelves, contained 203 books. Each shelf contained the same number of books. How many books were there on a shelf?

13. A man sold 11 bicycles for $495. They were all sold at the same price. For how much did he sell each one?

PERSONAL ACCOUNTS OF TWO BOYS

Weekly Account

March

3	Salary		7.00
	Car fare	.10	
	Lunch	.15	
4	Necktie	.25	
	Car fare	.10	
	Lunch	.10	
5	Car fare	.10	
	Lunch	.20	
	Pencil	.05	
6	Car fare	.10	
	Lunch	.15	
	Collars	.12	
7	Car fare	.10	
	Lunch	.10	
8	Car fare	.10	
	News paper	.06	
	Laundry	.15	
	Board	3.75	
	Savings bank	.50	

Yearly Expense.

Vacation	10.00
Books etc	5.00
Clothing etc	35.00

Monthly Account

Salary		40.00
R. R. Ticket	2.25	
Board & Room	18.00	
Lunches	3.75	
Laundry	.70	
Savings bank	3.50	
Collars & ties	.50	
News paper	.30	

Yearly Expense

Vacation	10.00
Books etc	7.00
Clothing	40.00

1. Find the expense for each day in the weekly account. Find the yearly expense for car fare? For lunches?

2. At the salary given in the monthly account, how much would be saved in a year with the yearly expenses as given? In 5 years?

3. At the salary given in the weekly account, how much would a boy earn in a year? How much would he save, counting the yearly expenses as given?

4. Make and solve other problems from these accounts.

Answer all you can orally.

A merchant offered the following lots of goods for sale:

2 suits boys' clothes	$ 8.50
15 dozen handkerchiefs	27.00
12 dozen pairs suspenders	36.00
50 boxes (each containing ½ dozen pairs) of stockings	60.00
3 dozen shirts	16.20
1 dozen pairs trousers	15.00
½ dozen waistcoats	3.00
3 dozen caps	5.40
4 dozen hats	12.00
10 boxes of collars, each holding ½ dozen	6.00

1. As sold in this way, what was the cost of:

A suit?
A handkerchief?
A pair of suspenders?
A ½ dozen pairs of stockings?
A dozen shirts?
A pair of trousers?
A dozen hats?
A half-dozen collars?
A dozen handkerchiefs?
A dozen pairs of suspenders?
A box of stockings?
A pair of stockings?
One shirt?
A dozen caps?
A box of collars?
One collar?

2. A second merchant bought the whole lot of goods at $187. Did the first merchant sell for more or less than the price offered? How much was the difference between the two prices?

3. The second merchant then sold the following goods at one fourth more than the prices printed above:

One suit. Six handkerchiefs. One pair of suspenders. Three pairs of stockings. One shirt. One hat and one dozen collars. How much was the bill?

1. An acre of tobacco is valued at about \$52; an acre of sweet potatoes at \$37; an acre of sugar beets at \$30, and an acre of peanuts at \$14. At this rate, what is the entire value of 2 acres of each?

2. To send a telegram from Chicago to San Francisco costs \$.75 for the first 10 words, and 5¢ for each added word. What would a message of 19 words cost?

3. At 40 cents for the first 10 words, and 3 cents for each added word, what will it cost to send the following telegram "Express two hundred Mother Goose, fifty Jo's Boys, one hundred twenty Little Women"?

4. Mrs. Brown had 3 sons. John earned \$5 a week, Harry earned \$7, and William as much as the other two. How much did William earn? How much did all earn?

5. John saved $\frac{1}{5}$ of his money each week. How many dollars did he save? How much did he spend?

6. Harry saved $\frac{1}{2}$ of his money. How many dollars did he save? How much did he spend?

7. William spent $\frac{1}{4}$ of his money. How many dollars did he save? How much did he spend?

8. How much did the 3 boys together save in a week? How much did they spend in a week? In 4 weeks?

9. A room is 12×15 feet. How many strips of carpet a yard wide will be needed to carpet it? How long will each strip be? How many yards will it take for the whole room? What will it cost at 40¢ a yard?

10. A block of granite containing 24 cubic feet was 2 feet high and 3 feet wide. How long was it?

11. A lamp post 12 feet long was 2 feet in the ground. What part of it was in the ground? What part was in the air? How many feet were in the air?

1. An Angora kitten was bought for \$6 and sold for $\frac{1}{3}$ more. What was the selling price?

2. If peanuts are bought at \$5 a bushel and sold at 5 cents a half-pint glass, what is the gain on a bushel?

3. The railroad fare from Chicago to Madison, Wis., is \$2.60. What will it cost for 5 persons to make the trip both ways?

4. What is the difference between the buying price and the selling price of a bicycle that was bought for \$35 and sold for $\frac{1}{7}$ more than it cost?

5. A boy bought 3 oranges for 10 cents, and traded them for 5 apples. What were the apples worth apiece?

6. A boy bought a pony for \$35. He had it shod for \$2, and kept it a month at an expense of \$4. He then sold it for \$40. Did he gain or lose, and how much?

7. One spring the robins arrived in the country bordering the southern part of the Great Lakes, March 2. The bluebirds came 25 days later. On what date did the bluebirds arrive?

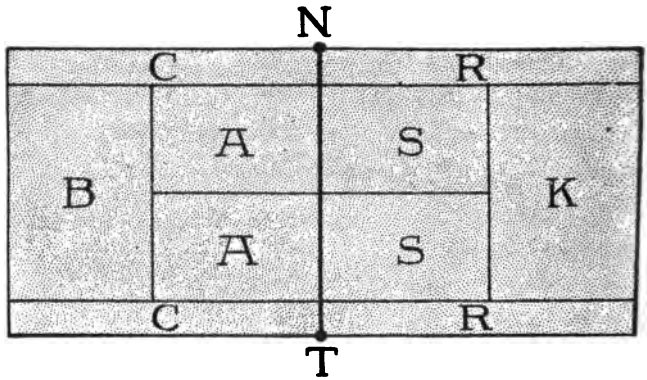
8. In 1900 the government gave \$25,000 to the reindeer stations in Alaska. Only \$19,330 was used. How much was left?

9. During the week ending March 4, 1905, there were received in the stockyards at Omaha, 69,296 cattle, 6124 calves, 178,077 hogs, and 73,400 sheep. The shipments for the same week were 32,191 cattle, 327 calves, 62,953 hogs, and 19,896 sheep. How many cattle, calves, hogs, and sheep together were received during that week?

10. How many cattle were not shipped? How many calves? How many hogs? How many sheep?

11. How many animals were not shipped?

TENNIS COURT



1. A tennis court is divided into 2 equal parts by the net, NT. The whole court is 78 feet long and 36 feet wide. How long and how wide is each half?

2. The court is divided into parts by lines as shown in the drawing. The strips, C, are each $4\frac{1}{2}$ ft. wide. How long is the part, B? B, is 18 ft. wide. How long is the part, A?

3. The parts, A, are of equal width. How wide is each?

4. The other half of the court is divided the same way. How long is the part, R? How long and how wide is the part, K? How do the parts, B and K, compare?

5. How long and how wide is the part, S? How long and how wide is the part made of both SS's?

6. The parts, C, fitted together side by side, would make how wide a rectangle? What is its area?

7. What is the area of the part, R?

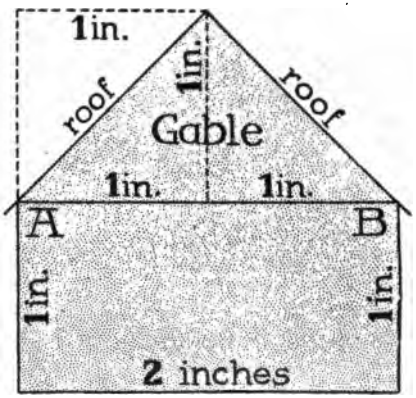
8. What is the area of the parts, A, taken together? Of the parts, S? Of B? Of AA, B, and C, together?

9. What is the area of the whole tennis court?

10. Compare the answer to 9 with the area found by multiplying the length of the court by its width.

1. Study the drawing of the end of a toy-house; notice the dotted lines, and tell how many square inches there are in the gable

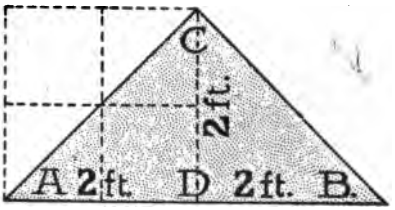
The part of the end above the line, AB, and under the roof is the *gable*.



End of a toy-house.

2. How many square inches are there in the whole end of the house? In both ends of the house?

3. A boy made a chicken-coop with ends like the drawing, ABC. The base, AB, was 4 feet long. The height, CD, was 2 feet. Study the drawing; notice the dotted lines, and tell how many square feet of lumber were needed for the end of the coop.



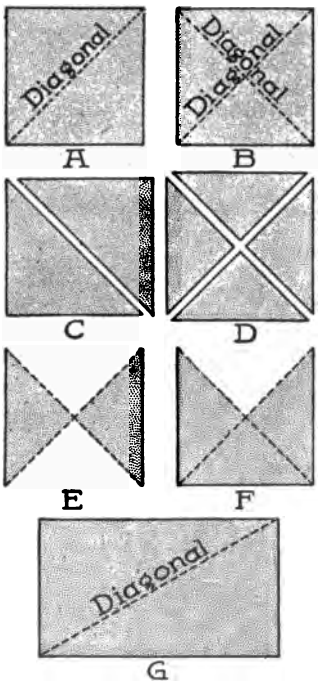
End of chicken-coop.

4. How many square feet of lumber were needed for both ends of the coop? For both ends of 3 such coops?

5. A flower bed has the shape of a triangle. The sides are 4 yards, 4 yards, and 4 yards. How long a string will be needed just to reach around it? How many feet long must the string be?

6. The 3 sides of a triangle are 6 yards, 8 yards, and 10 yards. How many feet is it around the triangle?

SQUARES AND RECTANGLES



1. Draw a square. Draw a line connecting two of its opposite corners. Such a line is a diagonal.

2. How many diagonals can be drawn in a square?

3. How does a diagonal seem to divide a square?

4. Carefully draw a square on paper and cut it out. Fold it over a diagonal as a hinge, and carefully press the two parts together. How do the two parts compare in size?

5. Notice figure B, and tell how the two diagonals of a square seem to divide it?

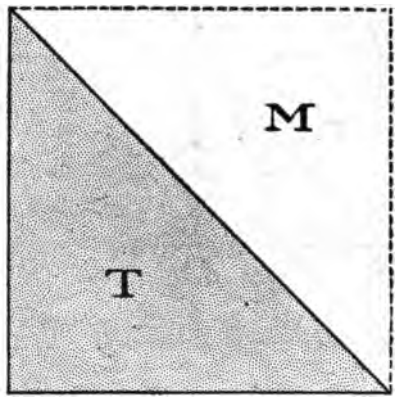
6. What parts of a square are shown in figure C? In figure D? In figure E? In figure F?

7. Look at figure G, and tell how a diagonal of a rectangle seems to divide the rectangle.

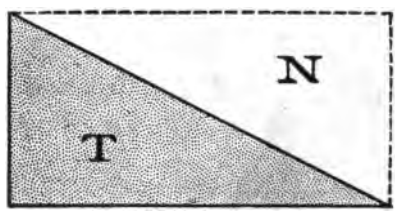
8. Carefully draw a rectangle on paper and cut it out. Then cut it along a diagonal and see if the two pieces can be made to fit closely. How does a diagonal divide a rectangle?

9. The area of a square is 36 square inches. What is the area of one of the parts into which a diagonal divides it?

10. The area of a rectangle is 8 square inches. What is the area of one of the parts into which a diagonal divides it?



A



B

1. How wide is the triangle, T, of figure A? How high?

2. What kind of figure is made by the triangle, T, and the dotted triangle, M?

3. What is the area in square inches of the figure A? Of the triangle, T, of figure A?

4. How long and how high is the triangle, T, of figure B?

5. The dotted triangle, N, of the figure B, makes with the triangle, T, what kind of figure?

6. How long and how high is the rectangle, B?

7. What is the area in square inches of the rectangle?

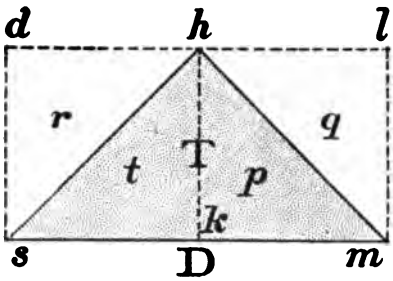
8. What part of the rectangle is the triangle, T?

9. What is the area in square inches of the triangle, T, of figure B?

10. Any square-cornered triangle with two sides equal, such as T, in figure A, makes $\frac{1}{2}$ of what kind of figure?

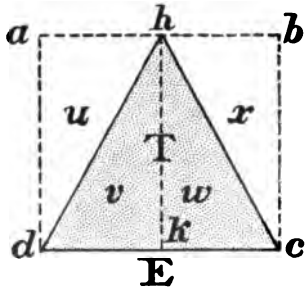
11. How may the area of any square-cornered triangle with two equal sides be found?

12. The area of any square-cornered triangle is what part of the area of a rectangle having the same length and height as the triangle?



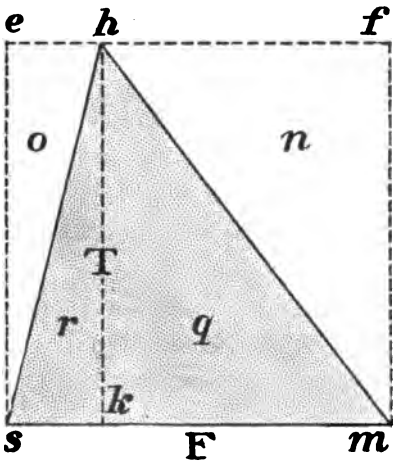
1. The area of the square, *dhks*, of figure D, is 1 square inch. Find the area of the triangle, *hks;* of the triangle, *dhs*.

2. The square, *hlmk*, is 1 inch long and 1 inch wide. What is the area of the triangle, *hmk*?



3. How many square inches are there in the rectangle, *dlms*, which is 2 inches long and 1 inch high? What is the area of the triangle, T?

4. Figure E shows an equal-sided triangle. Tell what part of the area of the dotted rectangle, *abcd*, the area of triangle, T, makes.



5. How does the length of the rectangle, *abcd*, compare with the length of the triangle, T? How does the height of the rectangle compare with the height of the triangle, T?

6. What part of a rectangle that has the length and height of an equal-sided triangle is the area of the triangle?

1. In figure F, the large triangle, T, is unequal-sided. The line, *hk*, divides triangle, T, into two unequal triangles, *r* and *q*. What part of the rectangle, *ehks*, is the triangle, *r*?

2. What is the area of the rectangle, *ehks*?

3. What is the area of the triangle, *r*?

4. The triangles, *q* and *n*, together (figure F, page 204) make what kind of figure?

5. If the area of the rectangle, *hfmk*, is 3 square inches, what is the area of triangle, *q*?

6. What is the area of the triangle, T, of figure F?

7. The area of a rectangle is 10 square inches. What is the area of a triangle that has the same length and height as the rectangle?

8. The area of a rectangle is 28 square yards. Find the area of a triangle having the same length and height as the rectangle.

The length of a triangle is called the *base*, and the height is called the *altitude* of the triangle.

9. Find the areas of triangles having the following bases and altitudes:

(1) base = 8 ft., altitude = 6 ft.
(2) base = 14 ft., altitude = 8 ft.
(3) base = 12 ft., altitude = 12 ft.
(4) base = 20 yd., altitude = 12 yd.
(5) base = 80 yd., altitude = 60 yd.
(6) base = 80 rd., altitude = 20 rd.
(7) base = 18 ft., altitude = 10 ft.
(8) base = 24 yd., altitude = 6 yd.
(9) base = 9 yd., altitude = 3 yd.
(10) base = 17 yd., altitude = 15 yd.

1. What part of a dollar is 50 cents? 25 cents? 10 cents?

2. A cent is what part of a nickel? What part of a dime?

3. 5 cents is what part of a dime? What part of a quarter?

4. $\$\frac{1}{4}$ and $\$\frac{1}{4}$ is what part of a dollar?

5. What part of a yard is a foot? Two feet?

6. $\frac{1}{3}$ of a yard and $\frac{1}{3}$ of a yard equals what part of a yard?

7. 6 inches is what part of a foot? Of 2 feet? Of a yard?

8. What part of a foot is 4 inches? Three inches?

9. $\frac{1}{4}$ of a foot and $\frac{1}{4}$ of a foot equals what part of a foot?

10. $\frac{1}{3}$ of a foot and $\frac{1}{3}$ of a foot equals what part of a foot?

11. What part of a foot is an inch? 2 inches? 5 inches? 7 inches?

12. $\frac{1}{6}$ of a foot and $\frac{1}{6}$ of a foot equals what part of a foot?

13. What part of a quart is a pint?

14. What part of a pint is a gill? 2 gills? 3 gills?

15. What part of a gallon is a quart? 2 quarts? 3 quarts?

16. What part of a gallon is a pint? 3 pints? 5 pints?

17. $\frac{3}{8}$ of a gallon and $\frac{3}{8}$ of a gallon equal what part of a gallon?

18. What part of a peck is a quart? 2 quarts? 3 quarts? 5 quarts? A peck is what part of a bushel?

19. $\frac{1}{4}$ of a bushel and $\frac{2}{4}$ of a bushel equals what part of a bushel?

20. $\frac{1}{8}$ of a peck and $\frac{3}{8}$ of a peck equals what part of a peck?

1. James picked $\frac{3}{8}$ of a peck of berries in the morning and $\frac{2}{8}$ of a peck in the afternoon. What part of a peck did he pick that day?

2. From $\frac{3}{4}$ of a dozen oranges $\frac{2}{4}$ of a dozen were taken. What part of a dozen remained?

3. Henry was absent from school $\frac{1}{4}$ of a day on Monday and $\frac{1}{4}$ of a day on Thursday. What part of a day was he absent altogether?

4. $\frac{1}{8}$ of a glass of water was poured from a glass $\frac{5}{8}$ full. What part of a glass of water remained?

5. $\frac{1}{8}$ of a bushel of oats was fed to each of 6 horses. What part of a bushel was fed to all?

6. Ida had $\$\frac{1}{2}$. She bought a book for $\$\frac{1}{4}$. What part of a dollar did she have left?

7. A package of pepper weighed $\frac{1}{4}$ of a pound and a bag of salt, $1\frac{1}{2}$ pounds. How much did both weigh?

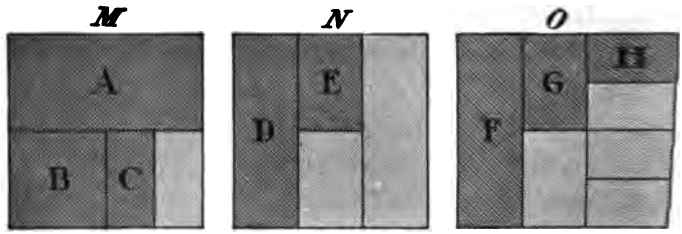
8. On a policeman's coat sleeve there are 4 pieces of braid, each $\frac{1}{6}$ of a yard long. What part of a yard would they make altogether?

9. Draw a rectangle 2 inches long and 1 inch wide. Divide it into square inches. Shade $\frac{1}{2}$ of it and $\frac{1}{4}$ of it. What part of the rectangle is $\frac{1}{2}$ and $\frac{1}{4}$ of it?

10. Draw a rectangle 3 inches long and $\frac{1}{2}$ inch wide. Divide it into square half-inches. Shade $\frac{1}{2}$ of it and $\frac{1}{6}$ of it. What part of the rectangle is $\frac{1}{2}$ and $\frac{1}{6}$ of it?

11. Draw a 3-inch square. Divide it into square half-inches. Shade $\frac{1}{3}$ of it and $\frac{1}{9}$ of it. What part of the square is $\frac{1}{3}$ and $\frac{1}{9}$ of it?

12. Draw a line 6 inches long. Divide it into inches. Show $\frac{1}{3}$ of it and $\frac{1}{6}$ of it. What part of the line is $\frac{1}{3}$ and $\frac{1}{6}$ of it?



1. What part of *M* is A?

2. What part of A equals B? What part of B equals C?

3. B is what part of *M*? C is what part of *M*?

4. How many A's in *M*? How many B's? How many C's?

5. How many $\frac{1}{2}$'s in 1? How many $\frac{1}{4}$'s? How many $\frac{1}{8}$'s?

6. What part of $\frac{1}{2}$ is $\frac{1}{4}$? What part of $\frac{1}{4}$ is $\frac{1}{8}$?

7. What part of $\frac{1}{2}$ is $\frac{1}{8}$?

8. $\frac{1}{2}$ equals how many $\frac{1}{4}$'s? $\frac{1}{2}$ equals how many $\frac{1}{8}$'s?

9. What is the sum of $\frac{1}{2}$ and $\frac{1}{2}$? Of $\frac{1}{4}$ and $\frac{1}{4}$?

10. $\frac{1}{8}+\frac{1}{8}=?$ $\frac{1}{2}+\frac{1}{4}=?$ $\frac{1}{4}+\frac{1}{8}=?$ $\frac{1}{2}+\frac{1}{8}=?$

11. $\frac{1}{2}$ of a dollar and $\frac{1}{4}$ of a dollar are equal to what part of a dollar?

12. $\frac{1}{4}$ of a pie and $\frac{1}{8}$ of a pie are what part of a pie?

13. Marie cut a pie into 8 pieces and gave each one in the family one piece. There were 4 in the family. What part of the pie was used?

14. Harry bought a piece of wire. He divided half of it into fourths, and half into eighths. How many of each did he have? He used $\frac{3}{4}$ of the wire. How many eighths of the wire did he use?

15. It takes $\frac{1}{2}$ a gallon of oil to fill one lamp, $\frac{1}{4}$ of a gallon to fill another, and $\frac{1}{8}$ of a gallon to fill another. What part of a gallon does it take to fill the 3 lamps?

1. On page 208, E is what part of the square, *N*? How many E's = *N*? How many E's = D?

2. How many F's in *O*? How many G's in F? How many G's in *O*? G = what part of F? What part of *O*?

3. How many H's in G? In F? In *O*?

4. How many $\frac{1}{3}$'s in *O*? How many $\frac{1}{3}$'s in 1?

5. How many $\frac{1}{6}$'s in 1? How many $\frac{1}{12}$'s in 1?

6. How many $\frac{1}{6}$'s = $\frac{1}{3}$? How many $\frac{1}{6}$'s = $\frac{2}{3}$?

7. How many $\frac{1}{12}$'s = $\frac{1}{6}$? $\frac{3}{6}$? $\frac{5}{6}$?

8. How many $\frac{1}{12}$'s = $\frac{1}{3}$? How many $\frac{1}{12}$'s = $\frac{2}{3}$?

9. What is the sum of $\frac{1}{2}$ and $\frac{1}{6}$?

10. What is the sum of $\frac{1}{2}$ and $\frac{2}{6}$? $\frac{1}{2}$ and $\frac{1}{3}$?

11. What is the sum of $\frac{1}{2}$ and $\frac{1}{12}$? $\frac{1}{2}$ and $\frac{10}{12}$?

12. What is $\frac{1}{2}$ of $\frac{6}{12}$? Of $\frac{2}{3}$? Of $\frac{8}{12}$? Of $\frac{5}{12}$?

13.

$\frac{1}{2}+\frac{1}{2}=?$	$\frac{1}{3}+\frac{1}{3}=?$	$\frac{1}{4}+\frac{3}{4}=?$
$\frac{3}{4}-\frac{1}{2}=?$	$\frac{2}{3}-\frac{1}{6}=?$	$\frac{1}{4}-\frac{1}{8}=?$
$\frac{1}{2}+\frac{1}{4}=?$	$\frac{2}{3}+\frac{1}{12}=?$	$\frac{1}{4}+\frac{1}{8}=?$
$\frac{1}{2}+\frac{1}{8}=?$	$\frac{1}{3}+\frac{1}{6}=?$	$\frac{1}{4}+\frac{1}{12}=?$
$\frac{1}{2}+\frac{1}{6}=?$	$\frac{1}{3}+\frac{1}{12}=?$	$\frac{1}{4}+\frac{2}{4}=?$
$\frac{1}{2}-\frac{1}{4}=?$	$\frac{3}{4}+\frac{1}{2}=?$	$\frac{3}{4}-\frac{3}{8}=?$
$\frac{1}{3}-\frac{1}{6}=?$	$\frac{1}{2}-\frac{1}{8}=?$	$\frac{3}{4}+\frac{5}{8}=?$
$\frac{2}{3}+\frac{1}{6}=?$	$\frac{3}{4}+\frac{1}{8}=?$	$\frac{5}{6}+\frac{1}{12}=?$
$\frac{2}{3}+\frac{1}{3}=?$	$\frac{3}{4}+\frac{1}{12}=?$	$\frac{3}{8}+\frac{1}{2}=?$

14. Amanda cut a cake into 12 equal pieces. She put $\frac{1}{2}$ the cake into a box, $\frac{1}{4}$ on a plate, and the rest on a paper. How many pieces were in the box? On the plate? On the paper?

15. Willard divided one-half of a round chocolate loaf into 3 equal parts and the rest into 6 equal parts. He gave away 2 of the 3 equal parts and 3 of the 6 equal parts. What part of the loaf did he give away?

1. Draw a square and show the answers to these **problems**

$\frac{3}{4} - \frac{2}{4} = ?$ $\frac{7}{8} - \frac{1}{8} = ?$ $\frac{1}{2} - \frac{1}{3} = ?$ $\frac{7}{12} - \frac{1}{2} = ?$

$\frac{1}{2} - \frac{1}{4} = ?$ $\frac{3}{4} - \frac{1}{2} = ?$ $\frac{1}{3} - \frac{1}{6} = ?$ $\frac{10}{12} - \frac{1}{4} = ?$

$\frac{1}{2} - \frac{1}{8} = ?$ $\frac{5}{8} - \frac{1}{2} = ?$ $\frac{2}{3} - \frac{1}{6} = ?$ $\frac{7}{8} - \frac{1}{2} = ?$

2. What is $\frac{1}{2}$ of $\frac{1}{4}$? What is $\frac{1}{3}$ of $\frac{1}{2}$? What is $\frac{1}{4}$ of $\frac{1}{2}$?

What is $\frac{1}{2}$ of $\frac{1}{3}$? What is $\frac{1}{3}$ of $\frac{1}{3}$? What is $\frac{1}{4}$ of $\frac{1}{3}$?

What is $\frac{1}{2}$ of $\frac{1}{6}$? What is $\frac{1}{3}$ of $\frac{1}{4}$? What is $\frac{1}{4}$ of $\frac{2}{3}$?

3. 2 times $\frac{1}{2} = ?$ 3 times $\frac{2}{3} = ?$ 4 times $\frac{1}{2} = ?$

2 times $\frac{1}{3} = ?$ 3 times $\frac{3}{4} = ?$ 4 times $\frac{1}{3} = ?$

2 times $\frac{2}{3} = ?$ 3 times $\frac{3}{8} = ?$ 4 times $\frac{1}{4} = ?$

3 times $\frac{1}{3} = ?$ 3 times $\frac{5}{8} = ?$ 4 times $\frac{2}{3} = ?$

3 times $\frac{3}{3} = ?$ 3 times $\frac{7}{8} = ?$ 4 times $\frac{3}{4} = ?$

4. What is $\frac{1}{2}$ of 6? What is $\frac{1}{2}$ of 12? What is $\frac{1}{4}$ of 4?

What is $\frac{1}{3}$ of 6? What is $\frac{2}{3}$ of 6? What is $\frac{1}{4}$ of 12?

What is $\frac{1}{3}$ of 9? What is $\frac{2}{3}$ of 9? What is $\frac{1}{3}$ of 12?

What is $\frac{1}{4}$ of 8? What is $\frac{3}{4}$ of 8? What is $\frac{1}{3}$ of 18?

5.

2 times { $\frac{1}{2}$ of 6 = ? ; $\frac{1}{3}$ of 6 = ? ; $\frac{1}{2}$ of 8 = ? ; $\frac{1}{4}$ of 8 = ? }

$2 \times$ { $\frac{1}{3}$ of 9 = ? ; $\frac{2}{3}$ of 9 = ? ; $\frac{1}{2}$ of 16 = ? ; $\frac{1}{8}$ of 18 = ? }

6.

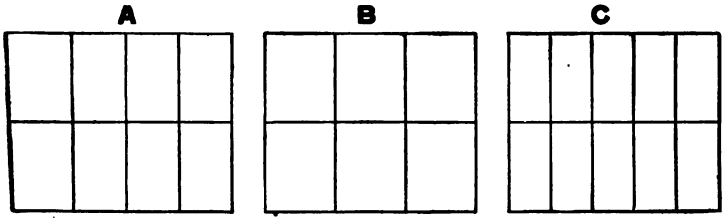
3 times { $\frac{1}{2}$ of 6 = ? ; $\frac{1}{3}$ of 6 = ? ; $\frac{2}{3}$ of 6 = ? ; $\frac{1}{4}$ of 8 = ? ; $\frac{1}{4}$ of 12 = ? }

$3 \times$ { $\frac{1}{2}$ of 12 = ? ; $\frac{1}{3}$ of 12 = ? ; $\frac{2}{3}$ of 12 = ? ; $\frac{1}{3}$ of 9 = ? ; $\frac{2}{3}$ of 9 = ? }

7.

4 times { $\frac{1}{2}$ of 6 = ? ; $\frac{1}{3}$ of 6 = ? ; $\frac{1}{2}$ of 8 = ? ; $\frac{1}{4}$ of 8 = ? ; $\frac{1}{4}$ of 12 = ? }

$4 \times$ { $\frac{1}{5}$ of 20 = ? ; $\frac{1}{4}$ of 20 = ? ; $\frac{3}{4}$ of 20 = ? ; $\frac{1}{3}$ of 18 = ? ; $\frac{2}{3}$ of 18 = ? }



1. Into how many parts is A divided?
2. How many 4ths of A are there in $\frac{1}{2}$ of A?
3. How many 8ths are there in $\frac{1}{2}$ of A?
4. How many 8ths of A are there in $\frac{1}{4}$ of A?
5. Into how many parts is B divided?
6. Find $\frac{1}{2}$ of B. How many 6ths are there in $\frac{1}{2}$ of B?
7. How many 6ths are there in $\frac{1}{3}$ of B?
8. Into how many parts is C divided?
9. Find $\frac{1}{2}$ of C. How many 10ths are there in $\frac{1}{2}$ of C?
10. How many 10ths are there in $\frac{1}{5}$ of C?
11. How many $\frac{1}{2}$'s are there in $1\frac{1}{2}$ A? In $1\frac{1}{2}$? In $2\frac{1}{2}$?
12. How many $\frac{1}{4}$'s are there in $1\frac{1}{4}$ A? In $1\frac{1}{4}$? In $1\frac{3}{4}$?
13. How many $\frac{1}{8}$'s are there in $1\frac{1}{8}$ A? In $1\frac{1}{8}$? In $3\frac{3}{8}$?
14. How many $\frac{1}{3}$'s are there in $1\frac{1}{3}$ B? In $1\frac{1}{3}$? In $2\frac{2}{3}$?
15. How many $\frac{1}{6}$'s are there in $1\frac{1}{6}$ B? In $1\frac{1}{6}$? In $\frac{1}{3}$ B?
16. How many $\frac{1}{5}$'s are there in $1\frac{1}{5}$ C? In $1\frac{1}{5}$? In $2\frac{3}{5}$?
17. How many $\frac{1}{10}$'s are there in $1\frac{1}{10}$ C? In $1\frac{1}{10}$? In $1\frac{2}{10}$? In $1\frac{3}{10}$? In $2\frac{5}{10}$? In $2\frac{9}{10}$? In $3\frac{1}{5}$? In $3\frac{2}{5}$?

18. $1\frac{1}{2}+2\frac{1}{2}=?$
$1\frac{1}{2}+1\frac{1}{4}=?$
$1\frac{1}{2}+2\frac{1}{3}=?$
$2\frac{1}{2}+1\frac{2}{3}=?$
$2\frac{1}{3}+1\frac{2}{3}=?$
$1\frac{1}{2}-\frac{1}{2}=?$
$1\frac{1}{2}-\frac{1}{4}=?$

19. $1\frac{1}{2}+2\frac{3}{4}=?$
$1\frac{1}{2}+1\frac{1}{8}=?$
$2\frac{1}{2}+5\frac{3}{8}=?$
$1\frac{3}{8}+1\frac{1}{2}=?$
$1\frac{7}{8}+1\frac{1}{4}=?$
$2\frac{1}{2}-1\frac{1}{2}=?$
$2\frac{1}{2}-1\frac{1}{4}=?$

20. $1\frac{1}{5}+2\frac{4}{5}=?$
$3\frac{2}{5}+1\frac{1}{5}=?$
$1\frac{1}{5}+1\frac{1}{10}=?$
$1\frac{4}{5}+1\frac{1}{10}=?$
$1\frac{4}{5}+1\frac{3}{10}=?$
$3\frac{7}{8}-1\frac{5}{8}=?$
$2\frac{9}{10}-1\frac{2}{5}=?$

1. What is the weight of 4 packages together, the first weighing $\frac{1}{8}$ of a pound; the second, $\frac{1}{4}$ of a pound: the third, $\frac{3}{8}$ of a pound, and the fourth, $1\frac{1}{4}$ pounds?

2. A tailor uses $4\frac{1}{3}$ yards of cloth for a coat; $1\frac{1}{8}$ yards for a vest, and $3\frac{5}{12}$ yards for a pair of trousers. How many yards does he use for the suit?

3. A man sold $3\frac{1}{4}$ pounds of butter to one customer, $2\frac{1}{2}$ pounds to another, and $4\frac{3}{8}$ to a third. How many pounds did he sell to all three?

4. A lady spends $\frac{1}{2}$ of the year in the city, $\frac{1}{4}$ of the year at the seashore, and the rest of the year traveling. What part of the year does she spend traveling?

5. From a piece of cloth 15 yards long, $8\frac{1}{3}$ yards were sold at one time and $2\frac{1}{6}$ yards at another time. How many yards were sold in all?

6. A baker having 5 dozen biscuits, sold $1\frac{1}{2}$ dozen to one man, and $3\frac{1}{2}$ dozen to another. How many dozen in all did he sell? How many dozen had he left?

7. $\frac{1}{2}$ of John's kite string is whip-cord. The rest is cotton string in 2 pieces. The first piece of cotton string is $\frac{1}{3}$ as long as the whip-cord. What part of the entire string is the first piece of cotton string?

8. One boy stays in the country $\frac{1}{3}$ of each year. A second boy stays $\frac{1}{3}$ as long as the first boy. What part of the year does the second boy stay?

9. How many boxes holding $\frac{1}{4}$ of a pound of candy each, can be filled from $\frac{1}{2}$ a pound? From $\frac{3}{4}$ of a pound? From $1\frac{1}{4}$ pounds?

10. A man bought $1\frac{1}{4}$ pounds of nuts and divided them equally among his 5 children. What part of a pound did each receive?

1. A boy bought at tne grocery 1 pound of sugar, $1\frac{1}{2}$ pounds of butter and $\frac{1}{4}$ pound of tea. How many ounces did the three together weigh?

2. A man bought $3\frac{1}{2}$ pounds of sugar and returned 12 ounces of it. How many ounces did he keep?

3. A woman bought at the grocery $1\frac{1}{2}$ pounds of butter at 24¢ a pound; a quarter of a pound of tea at 60¢ a pound, and 4 pounds of sugar at $5\frac{1}{2}$¢ a pound. How much was her bill?

4. A clerk sold 7 yards of cloth at 80¢ a yard; 9 yards of ribbon at 16¢ a yard, and $\frac{1}{2}$ a yard of velvet at $1.50 a yard. What was the amount of his sales?

5. A man bought a hatchet for 75¢, a saw for $1.25, $6\frac{1}{2}$ pounds of nails at 4¢ a pound, and 2 dozen screws at 9¢ a dozen. What was his bill?

6. A grocer bought 3 barrels of sugar containing 198 pounds each, at 4¢ a pound; 23 pounds of tea at 45¢ a pound, and 2 sacks of coffee containing 75 pounds each at 20¢ a pound. What was his bill?

7. A merchant bought 3 dozen pairs of shoes at $2.25 per pair, one dozen pairs at $2.50 a pair, and one-half dozen pairs at $2.75 a pair. How much was his bill?

8. A bookseller bought 50 books at 36¢ each, 2 dozen boxes of paper at 13¢ each, 9 dozen pencils at 11¢ a dozen. What was his bill?

9. Railroad fare is 2¢ per mile. From Chicago to Aurora it is 37 miles; from Aurora to Galesburg, 126 miles; from Galesburg to Burlington, 43 miles. What is the fare from Chicago to Aurora? From Chicago to Galesburg? From Aurora to Burlington? From Chicago to Burlington?

PRICE LIST OF MEN'S CLOTHING

	For Winter	For Summer
Overcoats at	$18.00	
Suits at	20.00	$15.00
Shirts at	1.50	1.00
Underwear, per suit	2.00	1.25
Shoes, per pair	3.50	2.50
Socks, per pair	.25	.25
Hats at	2.00	1.25
Trousers, per pair	5.00	3.00
Night-shirts at	1.00	.75
Overshoes per pair	.75	.50
Gloves, per pair	1.00	1.00
Mufflers, Neckties, at	1.00	.50
Collars	.12½	.12½
Cuffs, per pair	.25	.25

1. Early in June a man buys, for the summer, 2 shirts and 2 suits of underwear. At the prices of the table what does he pay for all?

2. Later in June he buys 4 pairs of socks, a pair of shoes, a hat, a necktie, a night-shirt, 2 collars and a pair of cuffs. Make out, on a separate slip, his bill and find the total cost at the prices given in the table.

3. A man buys, for the winter, an overcoat, a suit of clothing, 2 shirts and 2 suits of underwear. Make out his bill and find the cost of all his purchases at the prices given in the table.

4. Later the man bought, for winter, a pair of shoes, 4 pairs of socks, a hat, a pair of trousers, a pair of overshoes and a muffler. Make out his bill on a separate slip and find the total cost at the prices in the table.

5. A dealer in men's clothing says the average man buys for the summer a suit, 3 neckties, 2 shirts, a suit of underwear, a pair of shoes, 6 pairs of socks, a hat, 2 night-shirts, 6 collars, and 3 pairs of cuffs. How much does he pay for his summer clothing at prices in the table?

1. The same dealer says the average man buys for winter a suit, an overcoat, 3 shirts, 2 suits of winter underwear, a pair of shoes, 6 pairs of socks, a hat, a pair of extra trousers, 8 collars, 4 pairs of cuffs, a night-shirt, a pair of overshoes, a muffler, 2 50-cent neckties, and a pair of gloves. At the prices of the table, how much would these articles cost?

2. If the dealer's statement is correct, what is the cost of the clothing of the average man for the whole year, at the prices of the table?

3. If the man earns $18 a week, how much does he have left for other things than his own clothing during the whole year?

A dealer in women's clothing says the average woman buys in a year for general wear, for summer wear, and for winter wear, articles as shown in this table:

Articles	General wear	Summer	Winter.
Suits	.....	$10.00	$15.00
Dresses	$12.00	4.00	.....
Waists	5.00	2.25	2.25
Hats	.....	3.50	3.50
Shoes	5.20	.....	.....
Gloves	.....	1.50	1.50
Rubbers	.50	.....	.....

4. What is the yearly cost of a woman's clothing for general wear? For summer wear? For winter wear? For the whole year?

5. Find the yearly cost of clothing for both the man and the woman.

1. A man owns a lot on which he builds 2 houses. The first is $24\frac{1}{2}$ feet wide and 63 feet long; the second is 25 feet wide and $62\frac{1}{2}$ feet long. What is the area of the ground covered by the two houses?

2. On each side of 360 feet of a street, which is 60 feet wide, there is a sidewalk 7 feet wide. The rest of the street is the driveway. Find the area of the driveway.

3. A train of 3 cars runs every 30 minutes from 6 A. M. until 6 P. M. How many cars run over the track in this time?

4. A man mails 40 letters requiring 2¢ postage each, 375 circulars requiring 1¢ postage each, and 36 packages which require 4¢ each. What is the cost of the postage on the whole?

5. A man subscribed for the Youth's Companion for one year at $1.75, for St. Nicholas for 6 months at $2.50 a year, for the Century for 3 months at $4 a year and for McClure's for 18 months at $1 a year. How much must he pay for all the subscriptions?

6. A boy bought 24 1-cent papers at $\frac{3}{4}$¢ each, 16 2-cent papers at $1\frac{1}{4}$¢ each and 5 10-cent magazines at 7¢ each. He sold his entire stock at regular prices. How much money did he make?

7. A boy gets $3.75 for a week's work. He pays 10¢ each work-day for lunches; buys a ball for 15¢, and a stamp album for 75¢. How much money does he have left at the end of the week?

8. A man gets $17.50 a week for 4 weeks. Out of it he pays $11 for rent; buys half a ton of coal at $7.50 a ton; pays $12.75 for groceries, and $6.93 for dry goods. How much money has he left from his salary?

1. 48 men dig a cellar in 18 days. In how many days could 12 men dig it?

2. How many $\frac{1}{2}$-pound packages can be made from 18 chests of tea, each containing 60 pounds?

3. How many pounds of sugar at 6¢ a pound will equal in value 258 gallons of syrup at 40¢ a gallon?

4. A merchant exchanged 70 barrels of sugar at $22.50 per barrel for flour at $5 per barrel. How many barrels of flour did he receive?

5. If 250 desks, which cost $9 each, are sold for $12 each, what is the gain?

6. What do 144 quarts of cherries cost at 50¢ a peck?

7. What is the difference between 829 tons and $\frac{1}{12}$ of 9648 tons?

8. Mr. Monroe spent $139.65 in May, $15.25 more in June than in May, and $15.25 more in July than in June. How much did he spend in all?

9. A gentleman paid for a purchase with a $5 bill, and received in change one half-dollar, 3 quarters, 2 dimes and 2 nickels. How much was his purchase?

10. Find the distance in inches around a room that is 18 feet long and $14\frac{1}{2}$ feet wide.

11. A woman received $10,000 for a farm. She gave $1000 to a church, $500 to a school, and $2980 to a hospital. How much of the money had she left?

12. A carpenter bought 464 feet of lumber at one time and $\frac{1}{8}$ as much at another time. How many feet did he buy in all?

13. There are 387 squares of marble in the floor of the dining-room and seven-ninths as many in the parlor floor. How many squares in the parlor floor? In both floors?

1. A man paid \$24 for a suit of clothes; $\frac{1}{6}$ as much for a pair of shoes, $\frac{1}{8}$ as much for a hat. What was the cost of the entire outfit?

2. A man paid \$4860 for his house; $\frac{1}{3}$ as much for a lot; the grading and fencing cost $\frac{1}{4}$ as much as the lot. What did it all cost him?

3. A bookseller sold \$128 worth of books in one day. They cost him $\frac{1}{8}$ less than he sold them for. How much was his profit and what did the books cost him?

4. A bookseller sold 64 books at $12\frac{1}{2}$¢ each, and 48 books at 15¢ each. How much money did he receive?

5. There are 60 pupils in a school room. 24 of them have 4 books each, 26 of them have 3 books each, and the remainder have 5 books to each group of 2 pupils. How many books are there in the room?

6. A man is 48 years old; his wife is 44; the oldest son is $\frac{1}{4}$ as old as the father and mother together; the second son is $\frac{1}{3}$ as old as the father. What is the sum of the ages of the father, mother and two boys?

7. A boy went to college on the morning of September 5. He returned home on the morning of December 23. How many days was he away from home?

8. A family bought 1 quart of milk every day in January, February and March of a leap year. How many gallons did they buy in the 3 months?

9. For \$20 in gold a man received a \$10-bill, 7 dollars, and the rest in equal numbers of half-dollars and quarters. How many half-dollars did he get?

10. How many yards of wire are needed to build a fence six wires high around a garden 48 feet wide and 72 feet long?

A SCHOOL PROGRAM

TIME	RECITATION	STUDY PERIOD
9:00 to 9:10	Morning	Exercises
9:10 to 9:25	Language, A.	Written Work, B.
9:25 to 9:40	Language, B.	Written Work, A.
9:40 to 10:10	Arithmetic, A.	Study Reading, B.
10:10 to 10:30	Reading, B.	Study Arithmetic, A.
10:30 to 10:45	Recess.	
10:45 to 11:10	Arithmetic, B.	Study Reading, A.
11:10 to 11:30	Reading, A.	Study Arithmetic, B.
11:30 to 11:35	Calisthenics,	A and B.
11:35 to 11:45	Written Spelling	A and B.
11:45 to 12:00	Writing,	A and B.
1:30 to 1:45	Music,	A and B.
1:45 to 2:10	Geography, A.	Study Geography, B.
2:10 to 2:35	Geography, B.	Study Geography, A.
2:35 to 2:50	Recess.	
2:50 to 3:10	Oral Spelling,	A and B.
3:10 to 3:15	Calisthenics,	A and B.
3:15 to 3:50	Drawing,	A and B.

1. Find the time given to morning exercises; to morning recess; to music; to afternoon recess; to calisthenics in the morning; to drawing.

2. How much time does the A class spend in reciting and studying arithmetic? Reading? Geography?

3. Answer the same questions for the B class.

4. How much time, during one whole day, is given to calisthenics and recesses? To writing and drawing?

5. How long is the morning session? The afternoon session? The two sessions together?

6. If a boy from another grade came in and recited in language, A, arithmetic, B, and geography, A, how many hours would he spend in this room?

7. If a girl from another grade recited in this room in reading, B, arithmetic, B, geography, B, and drawing, how many hours and parts of an hour would she spend in this room?

GROCERY PRICE LIST

	Cost at Wholesale	Selling Price
Mocha coffee, per pound	$0.25	$0.32
Java coffee, per pound	.33	.40
Tea (gunpowder), per pound	.50	.60
Crackers, per pound	.06½	.09
Cinnamon, per pound	.30	.40
Black pepper, per pound	.17	.30
Ivory soap, per 100 bar box	4.00	per bar .04
Fels-naphtha " "	4.10	" " .05
Corn meal, per 100 lb.	1 50	per lb. .02½
Salt (100 sacks per bbl.), per bbl.	1.90	2 sacks .05
Graham flour (196 lb. to a bbl.)	per bbl. 3.90	per lb. .03
Winter wheat flour (196 lb. to a bbl.)	" " 5.15	per bbl. 6.25
Spring wheat flour " "	" " 6.20	" " 7.50
Straight grade flour " "	" " 4.80	" " 6.00
Baking powder, per doz. 1-lb. cans	2.40	per can .25
Canned corn, " "	.96	" " .10
Canned tomatoes, " "	1.44	" " .15
Canned peaches, " "	2.28	" " .25
Canned peas, " "	1.68	" " .20
Canned salmon, " "	2.28	" " .24

NOTE: Prices of groceries change from time to time and are different in different places. Make problems using the prices in your local papers. The following problems use the price list here given.

One Saturday a grocer put up the following orders:

1. 3 pounds Mocha coffee; 2 pounds gunpowder tea; ¼ pound cinnamon; ½ pound black pepper; ½ dozen bars ivory soap; 10 pounds corn meal; 4 sacks of salt. What was the amount of this bill?

2. One barrel straight grade flour; 2 cans baking powder; ½ doz. cans each of corn, tomatoes, peaches, peas, and salmon. What was the amount of this bill?

3. For Mr. M. E. Potter:

One barrel spring wheat flour; 100 pounds corn meal; 20 sacks salt; 50 pounds Graham flour, and 100 bars fels-naphtha. What sum will pay Mr. Potter's bill if the grocer reduces it 5¢ on each dollar?

1. For Mr. E. G. Smith:

One barrel spring wheat flour; 30 lb. Graham flour; ½ dozen cans baking powder; 2 lb. cinnamon; 3 lb. crackers; 50 sacks salt. What was the amount of Mr. Smith's bill? How much did the grocer gain?

2. For Mr. G. A. Tanby:

Two pounds gunpowder tea; 50 lb. corn meal; 50 lb. Graham flour; 4 cans tomatoes; 3 cans peaches; 5 cans salmon. What was the amount of Mr. Tanby's bill? What did the grocer gain?

3. For Mr. G. W. Williams:

5 pounds Java coffee; 3 lb. tea; 4 lb. crackers; 1 dozen bars fels-naphtha; 1 barrel winter wheat flour; ¼ doz. cans baking powder; ½ doz. cans peas; ½ doz. cans salmon. What was the amount of Mr. Williams's bill? How much did the grocer gain?

4. The following list of goods would cost how much?

50 lb. cinnamon; 25 lb. black pepper; 3 boxes ivory soap; 2 bbl. salt; 6 bbl. spring wheat flour; 1 doz. cans baking powder.

5. How much money would the grocer receive for the list in problem 4?

6. How much would the grocer gain from selling the list in problem 4?

7. Find the cost to the grocer of the following list:

One barrel Graham flour; 1 barrel spring wheat flour; 1 barrel winter wheat flour; 1 barrel straight grade flour; 3 dozen cans baking powder; 2 dozen cans each of corn, tomatoes, peaches, peas, and salmon.

8. How much money would the grocer gain from selling the list in problem 7?

BOYS' CLOTHING		GIRLS' CLOTHING	
For Summer		**For Summer**	
Suit	$5.00	Hat	$2.25
Cap	.25	Tam O'Shanter	2.00
Jersey	.85	Cambric, 6 yd. @ (at)	.15
Tennis slippers	.75	Dimity, 7 yd. @	.25
Underwear	.25	Calico, 9 yd. @	.08$\frac{1}{3}$
Stockings	.25	Gloves (a pair)	1.00
Neckties	.25	Tennis slippers	.75
		Ribbon, 5 yd. @	.15
For Winter		**For Winter**	
Suit	$6.50	Serge, 5 yd. @	0.12\frac{1}{2}$
Overcoat	5.00	Cloak	9.50
Shoes	2.00	Shoes	2.00
Hat	1.25	Hat	2.00
Cap	.75	Rubbers	.75
Rubbers (a pair)	.75	Ribbon, 3 yd. @	.18
Sweater	.90	Muslin, 10 yd. @	.12$\frac{1}{2}$
Handkerchiefs (one doz.)	.65	Embroidery, 4 yd. @	.25
Mittens	.48	Handkerchiefs (1 doz.)	.75
Underwear (a suit)	.47	Gingham, 10 yd. @	.14
Stockings	.35	Calico, 8 yd. @	.07
Neckties	.35	Mittens (a pair)	.45
		Gloves (a pair)	1.25

1. School supplies cost $4.75 for each of a family of six children. What was the entire cost?

2. There was bought one month for a boy each item in the above list of boys' clothing for summer. What was the whole cost? What would have been the cost for 4 boys?

3. In October each item in the list of boys' clothing for winter was bought for a boy. What was the whole cost? What would it have been for 3 boys?

4. Each item in the list of girls' clothing for summer was bought for a girl. What was the whole cost? What would it have been for 3 girls?

5. Make other problems from these lists, such as the cost for a family of 2 boys and 3 girls for clothing for winter or for summer; the cost of 2 pairs of shoes, 2 hats, 2 pairs of rubbers, etc.

1. How many square yards of carpet will be needed to cover a floor 27 feet long and 24 feet wide?

2. A dog-kennel that is $4\frac{1}{2}$ feet high, 2 feet wide, and 4 feet long, contains how many cubic feet?

3. How many feet of fence will be needed to fence a garden 36 yards long and 27 yards wide?

4. How many books, each taking 96 cubic inches, can be packed in a box containing 4608 cubic inches?

5. Add:

7026	6726	6728	6724
7968	9872	9739	3072
9872	6879	8725	5192
9763	8979	9734	6789
8429	7269	2459	1978

6. Subtract:

4072	6720	6729	3072
3987	5987	5989	1998

7. Multiply:

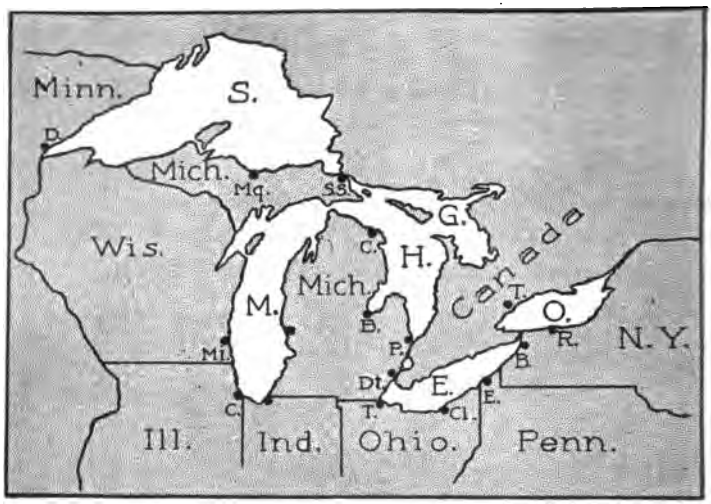
4276	6725	7268	8796
36	98	49	57

8. Divide:

$27\overline{)24516}$	$98\overline{)9702}$	$47\overline{)3055}$
$65\overline{)2015}$	$90\overline{)2250}$	$85\overline{)9726}$

9. Anson earned \$4.25 each week for $14\frac{1}{2}$ weeks. How much did he earn in that time?

10. Louise bought 14 yards of cloth at 92¢ a yard, 9 yards of ribbon at 45¢ a yard and a piece of lace at 70¢. She gave in payment a 20-dollar bill. How much change should she receive?



1. An excursion steamboat ran from Chicago (C on the map) to Sault (Sōō) St. Marie, called the Soo, and marked, SS, on the map, in 20 hours at the rate of 22 miles per hour, and returned by the same route in 19 hours. How far is it by this route from Chicago to the Soo? What was the rate of running on the return trip?

2. A boat ran from the Soo to Duluth, (D) Minn., in 18 hr. at 24 mi. an hr. and returned to the Soo by the same course in 20 hr. How far is it by this course from the Soo to Duluth? Find the rate of running on the return trip.

3. It took a boat 14 hr. running 20 mi. an hr. to go from the Soo to Port Huron (P), Mich. How far is it?

4. It takes a boat 4 hours, running 16 miles an hour, to run from Port Huron to Detroit (Dt), Mich., and 5 hours, running 11 miles an hour, to go from Detroit (Dt) to Toledo (T), Ohio. How far is it from Port Huron to Detroit? From Detroit to Toledo, Ohio?

1. A steamer ran from Toledo to Cleveland (Cl), in 6 hr. from Cleveland to Erie (E), Penn., in $5\frac{1}{2}$ hr., and from Erie to Buffalo (B) in $4\frac{1}{2}$ hr. The rate of the boat, while running, was 18 mi. an hr. How far apart are these places?

2. Lake Ontario is 198 miles long. How long would it take a boat running 18 miles an hour to run on a direct line from one end of the lake to the other?

3. How long would it take a boat, running 19 miles an hour, to cross Lake Ontario at its widest part, where it is 57 miles wide?

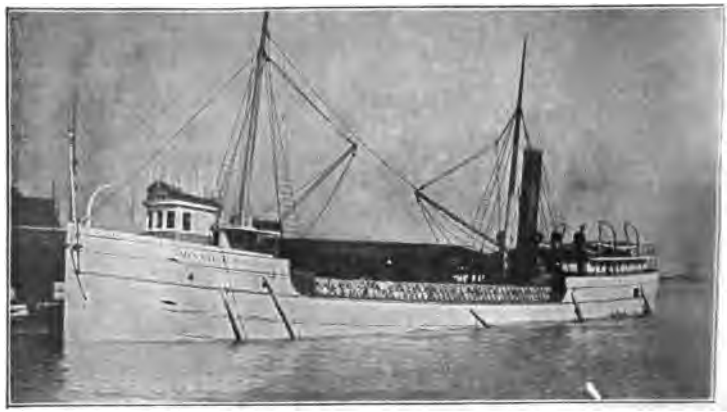
4. Lake Erie is 60 miles wide at its widest place. How long would it take a boat to sail directly across it at its widest place, at the rate of 8 miles an hour?

5. How long would it take a steamboat, running 16 miles an hour, to run from Bay City (B), Mich., to a point on the shore of Georgian Bay, 232 miles distant?

6. How long would it take to sail from Marquette (Mq.), Mich., directly north across Lake Superior, sailing 8 mi. an hr., if the distance is 178 miles?

Lake	Area	Length	Width
Ontario	7200 sq. mi.	90 mi.	..... mi.
Erie	10000 sq. mi.	100 mi.	..... mi.
Michigan	22500 sq. mi.	250 mi.	..... mi.
Huron and G'n Bay	24000 sq. mi.	200 mi.	..... mi.
Superior	31500 sq. mi.	210 mi.	..... mi.
Total	95200 sq. mi.	400 mi.	..... mi.

7. If the surface of the lakes named in the table above could be changed into rectangles of the same area as the lakes, the rectangles would have the areas given in the second column. If the lengths of these rectangles were as shown in the third column, how wide would they be?



SHIPPING SALT ON LAKE MICHIGAN

The Kelton was formerly engaged in carrying salt between Manistee, Michigan, and Chicago, Milwaukee, and South Chicago. Look up all these places on a map.

1. The Kelton left Chicago at 3:30 Monday afternoon for Manistee, 176 miles from Chicago. The boat reached Manistee at 7:30 Tuesday morning. How many hours did it take? How many miles an hour did the boat go?

2. At Manistee, the boat was loaded with 6500 bbl. of salt. The cost of loading was \$1 per 100 bbl., and it took 7 hr. to load. What was the cost of loading per hour? At what hour was the loading completed, if loading began as soon as the boat reached Manistee?

3. The boat left for Milwaukee, 88 miles from Manistee, at 2:30 P. M., Tuesday, and reached Milwaukee at 12:30 A. M., Wednesday. How long did it take and how many miles an hour did the loaded boat run?

4. The unloading at Milwaukee began at 7 A. M., Wednesday, and it took 10 hours. An hour was taken for dinner. How long since the boat left Chicago?

PART IV

1. How many rods is it from the middle of 12th St. to the middle of 13th St. (from B to C)? Scale, 1″:32 rd.

2. How many rods is it from C to D? From D to E? From E to F?

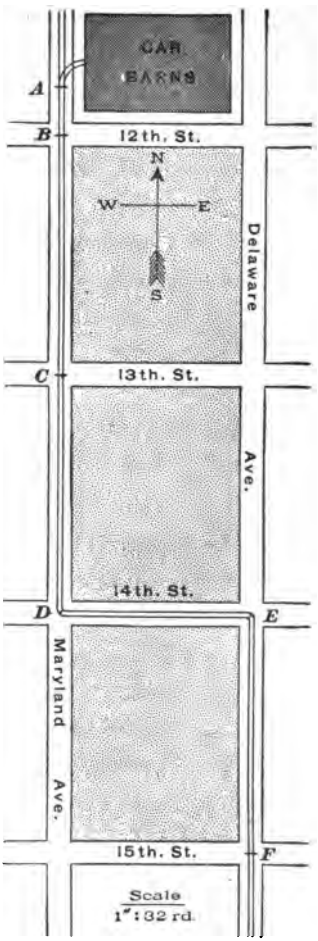
3. How many rods is it from A to B?

4. How many rods is it from A to D? From A to D to E to F?

5. The car-track runs on south 160 rods beyond F in Delaware Ave., and then turns east. How many rods is it from A to where the track turns east out of Delaware Ave.?

6. There are $5\frac{1}{2}$ yards in 1 rod. How many yards is it from A to B?

7. How many yards is it from B to C? From A to D to E? From A to D to E to F?



1. How many yards is it from F (p. 227) to where the track turns east out of Delaware Ave.?

2. How many yards long is the track from A to where it leaves Delaware Ave.?

3. There are $16\frac{1}{2}$ feet in 1 rod. How many feet is it from A to B? From B to C? From C to D? From D to E? From E to F?

4. How many feet is it from F to where the track leaves Delaware Ave.?

5. How many feet long is the track from A to where it leaves Delaware Ave.?

6. The distance from A to where the track leaves Delaware Ave. is 1 mile. How many rods are there in 1 mile?

7. How many yards are there in 1 mile? How many feet are there in 1 mile?

8. In the drawing how wide are the streets and avenues? How wide are the actual streets and avenues?

9. In the drawing how far is it from the middle of 12th street due south to the middle of 13th street? How many rods is it between the middles of the actual streets?

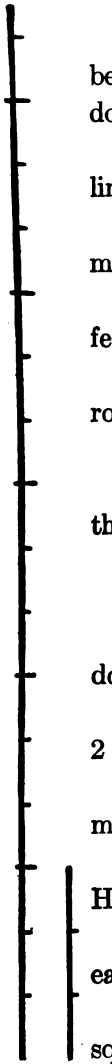
10. How many rods is it between the middle of Maryland avenue and the middle of Delaware Avenue?

11. How many north and south blocks, measured from middle to middle of streets, would make a mile?

12. How many east and west blocks, measured from middle to middle of avenues, would make a mile?

13. On the scale of the drawing (1 inch to 32 rods) how long a line would represent 1 mile?

14. How many eighths of an inch wide is the drawing of the car-barn? How many rods wide is the car-barn?



1. Measure these two lines. Suppose them to be drawn to the scale of 1 inch to 3 feet. What does the short line represent?

2. How many times the short line is the long line?

3. If the short line represents 1 yard, how many yards does the long line represent?

4. If the short line represents 3 feet, how many feet does the long line represent?

5. Call the distance the long line represents 1 rod. How many yards make a rod? How many feet?

6. How many feet make a yard?

7. How many inches make a foot? 320 times the distance the long line represents is a mile.

8. How many yards in a mile? Feet in a mile?

9. How many rods in a mile?

10. A boy walks 60 rods. How many yards does he walk? How many feet?

11. A lot 6 rods wide is divided lengthwise into 2 equal lots. How many feet wide is each lot?

12. A lot is 3 rods wide and 6 rods long. How many yards around it?

13. A bridge is 8 rods long and 2 rods wide. How many feet long is it? How many feet wide?

14. A rope 12 rods long is wound into coils, each coil using 6 feet. How many coils are there?

15. How many rods is it around a farm 2 miles square?

16. How many rods is it around a farm 3 miles square?

17. A bicyclist rode 30 miles in 1 hour. How many rods did he ride per minute? Per second?

TABLE OF EQUIVALENTS

1 foot	1 yard	1 rod	1 mile
12 inches	3 feet	$5\frac{1}{2}$ yards	320 rods
	36 inches	$16\frac{1}{2}$ feet	1760 yards
			5280 feet

1. A block is 22 rods wide and 33 rods long. How many yards is it around the block? How many feet?

2. A boy lives 64 rods from school. If he makes 4 trips a day how many yards does he go in 5 days?

3. A man lives $2\frac{1}{2}$ miles from his office. He goes to his office each day. How many rods does he travel from Monday morning until Saturday night?

4. A lot is $82\frac{1}{2}$ feet wide and 165 feet long. What is the cost of fencing it at 18¢ a yard? At 75¢ a rod?

5. The rails on a railroad are 2 rods long. How many rails are there in a mile of single track?

6. It cost 85¢ a linear foot for making a street. What was the cost of a quarter of a mile of this street?

7. A boy rode $7\frac{1}{8}$ miles on his wheel. How many rods did he ride?

8. John's school is 38 yards west from his home. He walked to the store 45 yards east and then to school. How many yards did he walk?

9. The tire of a wheel measures 6 feet. How many revolutions will it make in going 24 rods?

10. A boy steps 2 feet. How many yards does he go in 33 steps? How many rods? How many steps will he take in walking $\frac{1}{2}$ of a mile? $\frac{1}{4}$ of a mile?

11. If there are 8 blocks in a mile, how many feet are there in a block? How many rods?

12. A field is $\frac{1}{2}$ mile square. How many miles does a man travel in going around the field?

A B C

1. Suppose 1 inch on this line stands for (represents) a mile. A man goes from C to A and back to B. How many miles has he traveled?

2. From B he goes to C and returns to B. How many miles has he traveled?

3. Suppose one inch on the line represents 8 rods. How many yards is it from A to B? From B to C? From A to C?

4. John lives at B, Ned at A, and the schoolhouse is at C. John goes to Ned's house in the morning, then to school, and home in the evening. How many rods has he traveled?

5. The next day Ned goes to school, back to John's home, and they go back to school together. They return home in the evening. How many rods has Ned traveled? How many yards?

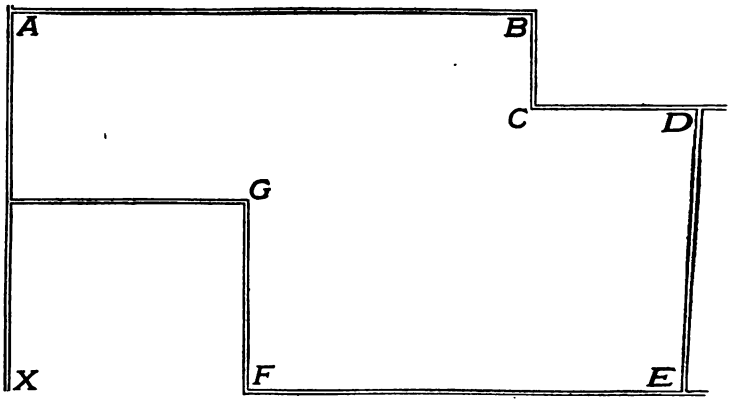
6. Let each pupil count the number of steps to his home from school, write it down, and the next day find the distance in feet, if his steps are 2 feet long. If he steps $1\frac{1}{2}$ feet. Tell whether it is nearer a mile, $\frac{1}{2}$ a mile, $\frac{1}{4}$ of a mile, or $\frac{1}{8}$ of a mile.

7. How many feet in $\frac{1}{2}$ of a mile? In $\frac{1}{8}$ of a mile?

8. 2 boys start from home and walk in opposite directions. They take 8 steps to the rod. How many rods apart are they after each has taken 80 steps?

9. Is their distance apart nearest to $\frac{1}{4}$, $\frac{1}{2}$, or 1 mile?

10. A boy takes 80 steps of 2 feet each in a minute. How far will he walk in 15 minutes? Is the distance nearer to $\frac{1}{4}$, or to $\frac{1}{2}$ of a mile?



Map of country road, starting from the street AX, drawn to a scale of one inch to four miles.

1. How many miles is it from the street to B? To D? To G?

2. How many miles is it from B to G? From D to G?

3. How far is the road B C from the street? How far is D E?

4. How far is the road F G from the road D E?

5. How far is the road F G from the street?

6. How far is the road A B from the road F E?

7. How far is G from the nearest point of the street?

8. How far is G from the nearest point in the road A B?

9. The distance, B C, equals what part of the distance, F G? What part of D E? What part of C D? What part of A B? What part of D F?

10. The distance, F G, equals what part of the distance A B? What part of the distance, D E?

11. The distance, C D, equals what part of the distance A B? What part of the distance, F G?

(On the map of the opposite page call 1 inch $\frac{1}{2}$ mile.)

1. How far is it from A to B? From A to C? From A to D? From B to C? From E to F? From E to G?

(On the map of the opposite page call 1 inch $\frac{1}{4}$ mile.)

2. How far is it from A to B? From A to C?

3. If a man walks from A to B in 15 minutes, how long will it take him to walk from D to E?

4. John rides his bicycle $1\frac{1}{2}$ miles in 8 minutes; Harry rides at the same speed for 5 minutes. How many more rods does John ride than Harry rides?

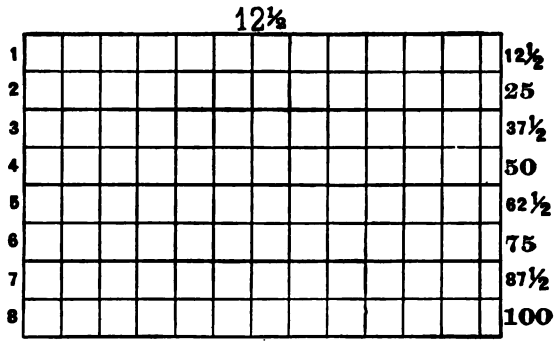
5. There are in a room 5 windows 9 feet high. How many yards of material of single width will be required to make 2 curtains for each of the windows? What will be the cost at 6¢ a yard?

6. The 4 windows of a schoolroom are 7 feet high. How many yards of material will be required for one curtain at each window, allowing 1 extra foot for each curtain? What will be the cost of the material at 25¢ a yard?

7. Each step in the staircase is 6 inches high and 1 foot wide. How many feet of stair carpet will be required for 12 steps? What will be the cost of the carpet at 75¢ a yard?

8. In a library $35\frac{1}{2}$ feet long and $23\frac{1}{2}$ feet wide, there are book shelves on one side and one end of the room. How many feet of boards, in length, will be required to make 5 of these shelves?

9. A pile of 10 blocks is placed 6 yards from a basket. A child starts at the basket, goes to the blocks and carries them 1 at a time to the basket. How far does he walk?



1. Add:

$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
		$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
			$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
				$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
					$12\frac{1}{2}$	$12\frac{1}{2}$
						$12\frac{1}{2}$

2. $12\frac{1}{2} \times 2 =$ .....? $12\frac{1}{2} \times 6 =$ .....?

$12\frac{1}{2} \times 3 =$ .....? $12\frac{1}{2} \times 7 =$ .....?

$12\frac{1}{2} \times 4 =$ .....? $12\frac{1}{2} \times 8 =$ .....?

$12\frac{1}{2} \times 5 =$ .....? $12\frac{1}{2} \times 10 =$ .....?

3. $25 \times 2 =$ .....? $25 - 12\frac{1}{2} =$ .....?

$25 \times 3 =$ .....? $50 - 12\frac{1}{2} =$ .....?

$25 \times 4 =$ .....? $75 - 12\frac{1}{2} =$ .....?

$50 \times 2 =$ .....? $100 - 12\frac{1}{2} =$ .....?

4. 25 is what part of 50? Of 75? Of 100? 50 is what part of 75? Of 100? 75 is what part of 100?

5. $12\frac{1}{2}$ is what part of 25? Of 50? Of 75? Of 100?

6. How many times $12\frac{1}{2}$ is $37\frac{1}{2}$? $62\frac{1}{2}$? $87\frac{1}{2}$?

7. What part of 100 is $37\frac{1}{2}$? $62\frac{1}{2}$? $87\frac{1}{2}$?

Answer all you can orally

1. A woman sold 4 dozen eggs at $12\frac{1}{2}¢$ a dozen. How much did she receive for them?

2. How many $12\frac{1}{2}¢$ make a dollar? $\frac{1}{4}$ of a dollar? A half-dollar? $75¢$?

3. A boy bought a dozen chickens at $12\frac{1}{2}¢$ each. The feed cost him $75¢$. He sold the chickens when they were grown at $25¢$ each. How much money did he make?

4. A farmer hired a boy to watch his corn-field and promised him $12\frac{1}{2}¢$ for every 3 squirrels and $12\frac{1}{2}¢$ for every 5 crows that he killed. At the end of a week the boy turned in 6 squirrels and 10 crows. How much should the farmer pay him?

5. A woman bought 10 yards of ribbon at $12\frac{1}{2}¢$ a yard and 8 yards of silk at $87\frac{1}{2}¢$ a yard. What did the ribbon cost? The silk? Both together?

6. A boy bought a ball for $12\frac{1}{2}¢$, a bat for $25¢$, and a glove for $37\frac{1}{2}¢$. How much did he pay for the outfit?

7. A girl bought a doll for $25¢$, a tablet and pencil for $12\frac{1}{2}¢$, and a book for $37\frac{1}{2}¢$. How much change should she receive if she gave the storekeeper $1?

8. A book-seller bought 5 books at $12\frac{1}{2}¢$ each, 8 boxes of paper at $12\frac{1}{2}¢$ each, and 7 dozen pencils at $12\frac{1}{2}¢$ a dozen. What was the cost of all?

9. A hall, $12\frac{1}{2}$ feet wide, is 6 times as long as wide. How long is it?

10. A board, $12\frac{1}{2}$ inches wide, is 7 times as long as wide. How many inches long is it?

11. A boy bought 3 dozen eggs for $\frac{3}{8}$ of a dollar, and sold them for $\frac{3}{4}$ of a dollar. What part of a dollar did he gain? How many cents a dozen did he gain?

1. A clerk sold 1 piece of silk cord $4\frac{1}{2}$ feet long, another $7\frac{1}{2}$ feet long. How many yards did he sell in all?

2. A man wishes to put 2 rows of wire above a fence 12 rods long. How many feet of wire does he need?

3. How many yards of carpet are needed to lay one width in a hall $22\frac{1}{2}$ feet long and on a flight of 16 stairs, each step requiring $1\frac{1}{2}$ feet of carpet?

4. John rides 12 miles, and his brother $\frac{3}{4}$ as far. How many rods does his brother ride?

5. A field is 160 rods long and 80 rods wide. How many feet of wire will go round it twice?

6. A man left home and drove 5 miles east; turned and drove 1000 rods back. How far was he from home?

7. The hall of a hotel is 14 yards long and $16\frac{1}{2}$ feet wide. How many feet of border will be required to go around the walls?

8. How many boards 12 feet long will make a fence 1 mile long, if there are 3 rows of boards?

9. One walk is 150 feet long, one is 80 feet, and one is 240 feet. How many yards long are all together?

10. How many miles long is a track having on one side 352 rails, each 30 feet long?

11. A street-car company lays 7 miles of track, $\frac{1}{4}$ of it running east and west, the rest north and south. How many rods of track are there in all? How many east and west? North and south?

12. A boy walked 2 miles, taking steps 2 feet long. How many steps did he take?

13. A farmer built a fence around a field $\frac{3}{4}$ of a mile long and $\frac{1}{2}$ of a mile wide. He used old material for 2250 yards. How many yards of new fencing did he use?

Answer all you can orally

1. Give the number of

11's in			3's in		12's in		
12	16	36	77	110	24	30	84
24	27	15	55	99	42	144	66
10	22	21	132	33	18	132	108
18	30	14	66	121	96	60	72
19	37	33	88	44	48	36	120

2.

$12 \times 4 =$.....?	$12 \times 5 =$.....?	$3 \times 11 =$.....?
$12 \times 9 =$.....?	$12 \times 3 =$.....?	$3 \times 12 =$.....?
$12 \times 7 =$.....?	$12 \times 12 =$.....?	$3 \times 5 =$.....?
$12 \times 10 =$.....?	$12 \times 6 =$.....?	$3 \times 8 =$.....?
$12 \times 8 =$.....?	$12 \times 11 =$.....?	$3 \times 9 =$.....?

3.

$12 \times 2\frac{1}{2} =$.....?	$12 \times 10\frac{1}{4} =$.....?	$3 \times 8\frac{1}{3} =$.....?
$12 \times 5\frac{1}{4} =$.....?	$12 \times 9\frac{1}{3} =$.....?	$3 \times 5\frac{1}{3} =$.....?
$12 \times 7\frac{1}{3} =$.....?	$12 \times 3\frac{1}{2} =$.....?	$3 \times 7\frac{1}{3} =$.....?
$12 \times 6\frac{1}{4} =$.....?	$12 \times 12\frac{1}{4} =$.....?	$3 \times 9\frac{1}{3} =$.....?
$12 \times 8\frac{1}{2} =$.....?	$12 \times 4\frac{3}{4} =$.....?	$3 \times 12\frac{1}{3} =$.....?

4. $5\frac{1}{2}$ is what part of 11? What part of $16\frac{1}{2}$? Of 22?

5.

$5\frac{1}{2} \times 2 =$.....?	$16\frac{1}{2} \times 3 =$.....?	$11 \times 8 =$.....?
$5\frac{1}{2} \times 4 =$.....?	$16\frac{1}{2} \times 6 =$.....?	$11 \times 9 =$.....?
$5\frac{1}{2} \times 7 =$.....?	$16\frac{1}{2} \times 4 =$.....?	$11 \times 12 =$.....?
$5\frac{1}{2} \times 8 =$.....?	$16\frac{1}{2} \times 2 =$.....?	$11 \times 4 =$.....?
$5\frac{1}{2} \times 6 =$.....?	$16\frac{1}{2} \times \frac{1}{3} =$.....?	$11 \times 7 =$.....?
$5\frac{1}{2} \times 9 =$.....?	$16\frac{1}{2} \times \frac{2}{3} =$.....?	$11 \times 10 =$.....?
$5\frac{1}{2} \times 3 =$.....?	$16\frac{1}{2} \times 1\frac{1}{3} =$.....?	$11 \times 6 =$.....?

6.

$\frac{1}{2}$ of 320 =.....?	$\frac{1}{10}$ of 320 =.....?	$\frac{1}{16}$ of 320 =.....?
$\frac{1}{8}$ of 320 =.....?	$\frac{1}{4}$ of 320 =.....?	$\frac{1}{32}$ of 320 =.....?

7. $5 \times 320 =$.....? $4 \times 320 =$.....?

8. What part of 320 is 40? What part is 80? 20?

1. A horse can go 1 mile in 6 minutes. At this rate how many rods would he go in an hour?

2. A carriage wheel measures 12 feet around the tire. How many times will it turn around in going 3 miles? In going 5 miles?

3. A wagon wheel is 10 feet around the tire. How many yards will it move along in going around 120 times?

4. A boy's top-string is 2 yards long. He cuts from it a piece 18 inches long. What is the length in feet of the remaining part?

5. A mile of gas pipe is laid at $5 a rod. What is the cost of laying?

6. What will 4 rods of hose cost at 25¢ a foot?

7. What will be the cost of a ditch half a mile long at $1.25 a rod?

8. What is the distance around a lot which is 50 yards and 2 feet long and 8 yards and 1 foot wide?

9. One cord of wood costs $5½. How much does 4 cords cost?

10. How many bins holding 5½ bushels can be filled from 16½ bushels of grain?

11. A man walked 16½ miles 1 day and 5½ miles the next. How many miles did he walk in all? How many miles farther the first day than the second?

12. At $5½ a ton, how many tons of coal can be bought for $22?

13. A farmer bought 16 sheep at $3 each and sold them at the rate of 3 for $12. Find the entire cost. Find how much he received. Find his gain.

14. What is the cost of a bale of cotton, containing 500 pounds, at 8½¢ a pound? At 10½¢ a pound?

1. Draw diagrams on a scale of 1 inch to 3 feet for rooms of the following dimensions:

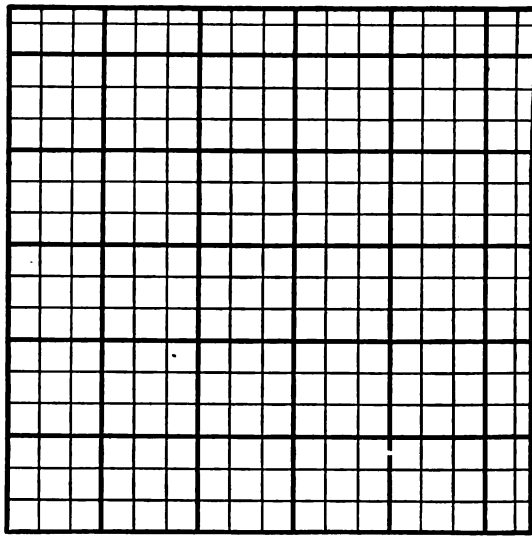
12 feet long and 9 feet wide
24 feet long and 18 feet wide
30 feet long and 27 feet wide
33 feet long and 21 feet wide
15 feet long and 12 feet wide
27 feet long and 15 feet wide
24 feet long and 15 feet wide
Give the perimeters in feet. In yards.

2. Draw diagrams on a scale of 1 inch to 3 yards for lots of the following dimensions:

15 yards long and 12 yards wide
18 yards long and 15 yards wide
12 yards long and 6 yards wide
15 yards long and 9 yards wide
24 yards long and 12 yards wide
33 yards long and 15 yards wide
27 yards long and 12 yards wide
Give the perimeters in yards. In feet.

3. Draw diagrams on a scale of $\frac{1}{2}$ inch to $\frac{1}{8}$ mile for fields of the following dimensions:

$\frac{1}{2}$ mile long and $\frac{1}{4}$ mile wide
1 mile long and $\frac{1}{2}$ mile wide
2 miles long and $1\frac{1}{2}$ miles wide
$1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile wide
$\frac{3}{4}$ mile long and $\frac{1}{2}$ mile wide
$1\frac{1}{2}$ miles long and $\frac{3}{4}$ mile wide
$1\frac{1}{4}$ miles long and $\frac{3}{8}$ mile wide
Give the perimeters in miles. In rods.



Plan of a square floor, drawn to a scale of ½ inch to 1 yard.

1. Measure the figure. What is the length? The width?

2. How many feet long is the floor? How many feet wide? How many yards wide?

3. Count the number of square yards. By what name is $16\frac{1}{2}$ feet known? By what name is $5\frac{1}{2}$ yards square known?

4. If a square were 320 times as long and wide as the square that the figure represents, how long and wide would it be? What is such a square figure called?

5. Draw a 6-inch square. Divide it into half-inch squares. How many squares are there in one row? How many rows? How many squares are there in all?

6. How many square inches in a square foot?

7. How many square feet in a square yard?

8. How many square yards in a square rod?

1. How many square feet in one row on one side of a square yard? How many rows of the same number of square feet? How many square feet in a square yard?

2. How many square yards in a square rod? (See p. 240.)

3. How many square yards in 2 square rods?

4. How many square yards in 4 square rods?

5. How many square yards in one-half of a square rod?

6. How many square yards in $2\frac{1}{2}$ square rods?

7. A garden contained $2\frac{1}{2}$ square rods and was 1 rod wide. How long was it?

8. A lot contains 20 square rods. How many square yards are there in it?

9. A lot containing 80 square rods was sold for \$240. What was the price per square rod?

10. A lot containing 160 square rods was sold at the rate of \$3 a square rod. How much was received for it?

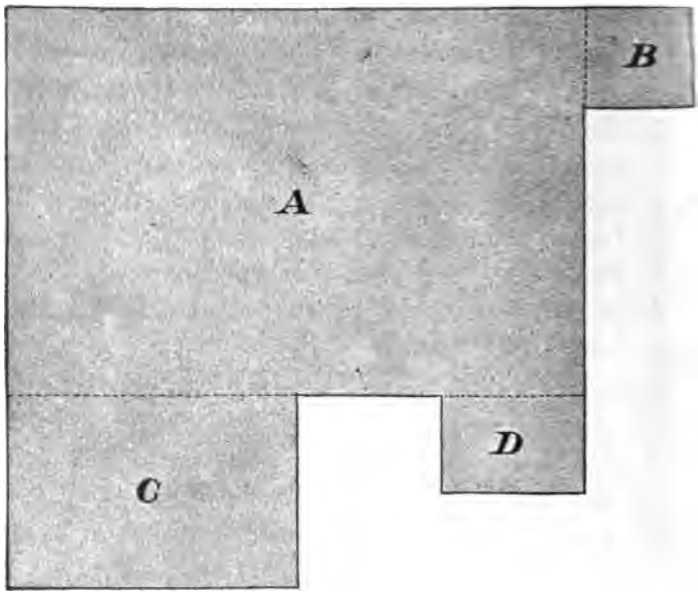
11. A street in a village was 6 rods wide and 40 rods long. How many square rods did it contain? How many square yards?

12. A street 250 rods long contains 10 blocks. Not counting crossings, how many rods long is each block? How many yards long is each block? How many feet?

13. Find the cost at \$2 a sq. yd. of paving 60 yd. of length of a street with a pavement 3 rd. wide. Find the cost of a strip 1 yd. wide reaching across the street.

14. A street is 28 blocks long. Each block, including crossing, is 15 rods long and 5 rods wide. How many square rods does the street contain?

15. A field 16 rods long and 10 rods wide contains how many square rods? What is the perimeter in rods? In yards? In feet?



Plan of a garden, drawn to a scale of 1 inch to 12 feet.

To find the area of the entire garden, first divide as indicated by the dotted lines.

1. The area of B is equal to how many square feet? How many square yards?

Find the area of D in square feet. In square yards. Find the area of C.

3. Find the area of A in square feet. In square yards.

4. Find the area of the entire garden in square yards.

5. C equals what part of A? D equals what part of C? Of A? B equals what part of D? Of C? Of A?

6. If 1 inch on the plan represents 4 yards, what is the area of each section in square yards? In square feet?

7. If 1 inch on the plan represents 8 rods, what is the area of each section in square rods?

TABLE OF SQUARE MEASURE

144 sq. in. (square inches) = 1 sq. ft. (square foot).
9 sq. ft. (square feet) = 1 sq. yd. (square yard).
30¼ sq. yd. (square yards) = 1 sq. rd. (square rod).
160 sq. rd. (square rods) = 1 A. (acre).
640 A. (acres) = 1 sq. mi. (square mile).

1. How many square rods in 60 acres?

2. In 32 sq. rd. how many square yards?

3. How many sq. ft. in 63 square yards?

4. In 37 sq. ft. how many square inches?

5. In 56 A. and 13 sq. rd. how many square rods?

6. In 47 sq. rd. and 9 sq. yd. how many square yards?

7. In 37 sq. yd. and 7 sq. ft. how many square feet?

8. Add:

4 sq. ft., 43 sq. in.	14 sq. yd., 2 sq. ft.
6 sq. ft., 84 sq. in.	11 sq. yd., 4 sq. ft.
7 sq. ft., 17 sq. in.	4 sq. yd., 3 sq. ft.

9. Add:

16 sq. rd., 4 sq. yd.	60 A., 15 sq. rd.
47 sq. rd., 8 sq. yd.	137 A., 40 sq. rd.
64 sq. rd., 15 sq. yd.	256 A., 56 sq. rd.
32 sq. rd., 3¼ sq. yd.	186 A., 49 sq. rd.

10. Subtract:

18 sq. ft., 56 sq. in.	16 sq. yd., 7 sq. ft.	18 A., 86 sq. rd.
5 sq. ft., 13 sq. in.	11 sq. yd., 3 sq. ft.	5 A., 17 sq. rd.

11. Multiply:

6 sq. ft., 24 sq. in.	6 sq. yd., 3 sq. ft.	3 A., 80 sq. rd.
6	3	2

1. A board is 13 feet and 4 inches long and 12 inches wide. What is the area of one side in square feet?

2. A house 24 feet wide covers 72 square yards of ground. How long is it? What is the distance around it?

3. The blackboards in a schoolroom are equal to 1 blackboard 54 ft. long and $4\frac{1}{2}$ ft. wide. How many sq. ft. of surface in all of the blackboards? How much will it cost to slate them at 36¢ a square yard?

4. How many acres of ground in 4000 square rods?

5. How much will a farm 240 rods long and 60 rods wide cost at $35 an acre?

6. A man has 10 acres and 90 square rods. He buys 8 acres and 70 square rods. How much land does he then have?

7. How many square feet in the floor of a room that is 24 feet long and $12\frac{1}{2}$ feet wide? How much will it cost to paint the floor at 25¢ a square yard?

8. How many square yards of cloth will it take to cover a table that is 48 inches long and 36 inches wide?

9. The floor of a hall 36 feet long and 6 feet wide is paved with marble blocks 1 foot square. How many blocks did it take to pave the hall?

10. A hall 24 feet long and 6 feet wide is paved with tiles 6 inches square. How many tiles are required?

11. A room is 18 feet long, 15 feet wide, and 9 feet high. How many square yards in the floor and ceiling. How many square yards in the walls?

12. How many square feet of sidewalk in 9 blocks of 528 feet each, if the sidewalk is 6 feet wide?

13. A building is 150 feet long and $40\frac{1}{2}$ feet wide. How many square yards does it cover?

1. Divide:

264 by 11, by 21, 31, 41, 51.
528 by 12, by 22, 32, 42, 52.
377 by 13, by 23, 33, 43, 53.
434 by 14, by 24, 34, 44, 54.
675 by 15, by 25, 35, 45, 55.
352 by 16, by 26, 36, 46, 56.

2. Divide each of the following numbers by 13, 14, 16, 29, 38, 46, 57, 74, 88, and 97:

118	154	172	120	156
213	237	248	253	269
3123	3234	3345	3456	3567
4678	5788	6879	7890	8901
9012	8123	7243	6542	5987

3. A man paid \$31.46 for eggs at 13¢ a dozen. How many dozen did he buy?

4. A tank holds 300 barrels of water. When it is $\frac{1}{15}$ full, how many barrels does it hold?

5. In a flock of 1736 sheep, $\frac{1}{14}$ of the number were lambs. How many lambs were there?

6. A man bought 20 feet of piping for \$6.40. How much per foot did it cost?

7. A man bought 18 yards of cloth for \$36.72. How much did it cost a yard?

8. A grocer sold 19 pounds of butter for which he received \$4.37. How much per pound did he get?

9. A boy can ride 15 miles an hour on his bicycle. At the same rate how many hours would it take him to ride 5136 miles?

10. The schoolroom floor contains 1100 square feet and is 25 feet wide. How long is it?

LONG DIVISION

1. Solve the following:

(1) $21\overline{)1302}$ (5) $34\overline{)7242}$ (9) $75\overline{)24300}$ (13) $121\overline{)9882}$

(2) $21\overline{)1575}$ (6) $37\overline{)4514}$ (10) $81\overline{)9801}$ (14) $124\overline{)10584}$

(3) $22\overline{)5302}$ (7) $37\overline{)8621}$ (11) $86\overline{)18404}$ (15) $214\overline{)18490}$

(4) $34\overline{)4216}$ (8) $62\overline{)7626}$ (12) $94\overline{)29610}$ (16) $315\overline{)29704}$

2. A field of 120 acres of corn yielded 4560 bushels. What was the yield per acre?

3. A man paid \$8400 for a farm that cost him \$75 per acre. How many acres were there in the farm?

4. A man paid \$11,200 for town lots, at the average price of \$175 a lot. How many lots did he buy?

5. A field is 140 rods long and contains 11,900 square rods. How many rods wide is the field?

6. How many cars that hold 48 tons each will be required to hold 6144 tons of coal?

7. There are 144 square inches in a square foot. How many square feet are there in 19,008 square inches?

8. How many bushels are there in a load of corn that weighs 3458 pounds, counting 56 pounds to the bushel? Write the remainder over the divisor as a fraction in the result.

9. Solve the following, writing the remainders over the divisors, as is shown in the first:

(1) $27\overline{)1170}$ $43\frac{9}{27}$ (4) $123\overline{)15293}$ (7) $280\overline{)18840}$ (10) $480\overline{)78060}$

(2) $64\overline{)3120}$ (5) $165\overline{)12595}$ (8) $275\overline{)30910}$ (11) $300\overline{)19410}$

(3) $123\overline{)9307}$ (6) $208\overline{)19864}$ (9) $424\overline{)47223}$ (12) $375\overline{)45600}$

CRANBERRY RAISING

State	Acres.	Bushels.	Bushels per acre.	State	Acres.	Bushels.	Bushels per acre.
Nebraska	1	20	20	Indiana	70	4360	$62\frac{4}{7}\frac{0}{0}$
South Dakota	1	22	..	Maine	90	1554	....
Kansas	1	30	..	New York	113	10677	....
Illinois	1	53	..	Michigan	150	3884	....
Iowa	1	61	..	Connecticut	275	6921	....
Washington	5	138	..	Rhode Island	300	6559	....
Oregon	6	712	..	Massachusetts	5123	598906	....
Minnesota	22	1120	..	Wisconsin	5821	111098	....
New Hampshire	22	973	..	New Jersey	8356	230231	....

The table shows the number of acres cultivated and the total number of bushels of cranberries grown in the states named in the year 1900.

1. Find the yield in bushels per acre for Washington. For Oregon. For Minnesota.

Note.—When there is a remainder write it over the divisor and make the fraction, thus formed, a part of the quotient.

$$\begin{array}{r} 50\frac{20}{22} \\ 22\overline{)1120} \\ 110 \\ \hline 20 \end{array}$$

Answer, $50\frac{20}{22}$ bushels per acre.

A zero is put in the quotient, because 22 does not go into 20 a whole number of times.

Show that this answer is about 51.

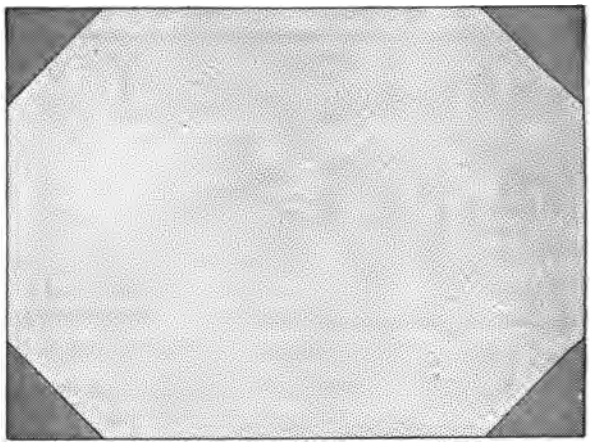
2. Find the yield per acre for each of the other states.

3. Divide the sum of the total yields by the sum of the total number of acres of the 9 states in the first part of the table, and find the average yield per acre.

4. Find the average yield for the first 5 states.

5. Find the average yield per acre for Illinois, Iowa, Indiana, and Minnesota together.

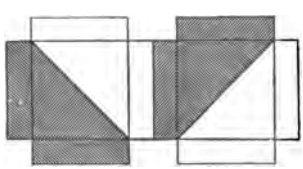
6. Find the average yield per acre for New York, Massachusetts, and Oregon together. Find the average yield per acre for Connecticut and Rhode Island together.



1. This drawing stands for a blotting pad, 24 in. long and 18 in. wide. How long is the drawing? How wide? What is the scale of the drawing?

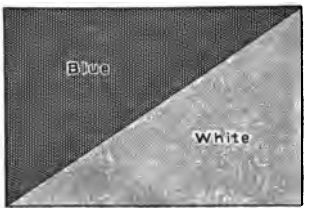
2. The corners are bound with pieces of red leather as shown. How long are the short sides of the corner pieces on the drawing? How long on the pad itself?

3. Cut two triangles out of paper and make them the size of a corner piece which can be seen from the top of the pad. How many square inches are there in each of them?

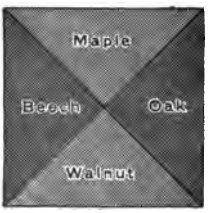


4. There is a strip, for pasting, one inch wide, on each of the two short sides of the leather corner pieces. How many square inches are there in each of the corner pieces with its two strips?

5. How long and how wide is the smallest piece of leather out of which the four corner pieces can be cut, each having two strips for pasting, as shown?

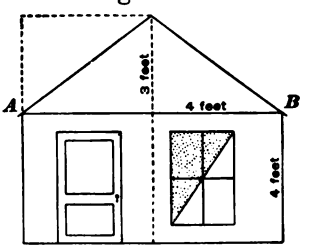


1. A rectangular flag, 6 feet long and 4 feet wide, is made of 2 pieces of cloth, sewed together on a line, as shown here. What part of the flag is blue? How many square feet are there in the white part?



2. The top of a box, 8 inches square, is made of 4 different kinds of wood, as shown. Draw, and cut out of paper, four pieces equal to the different pieces of wood. How many square inches are there in each piece? In all?

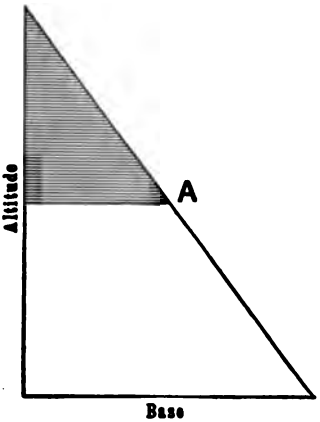
3. A rectangular garden, 24 feet by 40 feet, was separated into two parts by a straight line from corner to corner (a diagonal). Make a scale drawing of the garden in which one inch stands for 8 feet. How many square feet are there in each part of the garden?

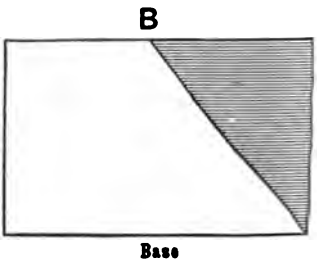


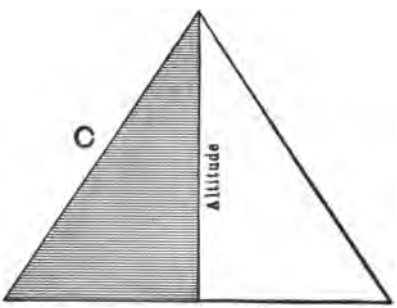
4. The front end of Harry's playhouse is 8 feet wide, 4 feet high on the sides, and 7 feet high at the centre. Make a scale drawing of the end.

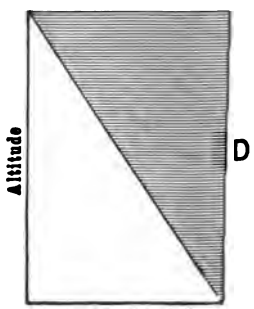
5. How many square feet are there in the front end below the line AB? Above AB? In the entire front end of the playhouse?

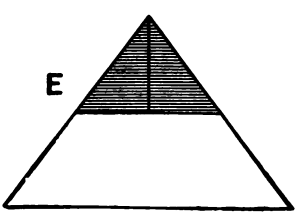
6. A front window is 3 feet high and 2 feet wide. A curtain covers a part of the window, as shown in the picture. How many square feet of the window does it cover?

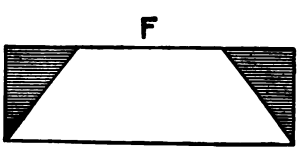

Altitude
A
Base


B
Base


C
Altitude


Altitude
D


E


F

1. What is the altitude of figure A, p. 250? The base?

2. Find the middle points of the altitude and of the long side of the triangle. Suppose the triangle cut on a straight line passing through these two points, and the parts turned about and fitted side by side, as in B.

3. What kind of figure is thus made (see B)? What is the length of B? The width? The area? The area of triangle, A?

4. Cut a 4-inch square. Draw a line connecting two opposite corners, and on this line cut the square in two. How long is the altitude of one of the triangles thus made? The base? Find the area.

The side a triangle is supposed to rest on, is called the *base*. The shortest distance from the base to the highest point is the height, or *altitude*.

5. What are the dimensions (base and altitude) of the triangle, C? Suppose the left side of the triangle, C to be turned about and laid upon the longest side of C, as in the figure D. What is the figure D?

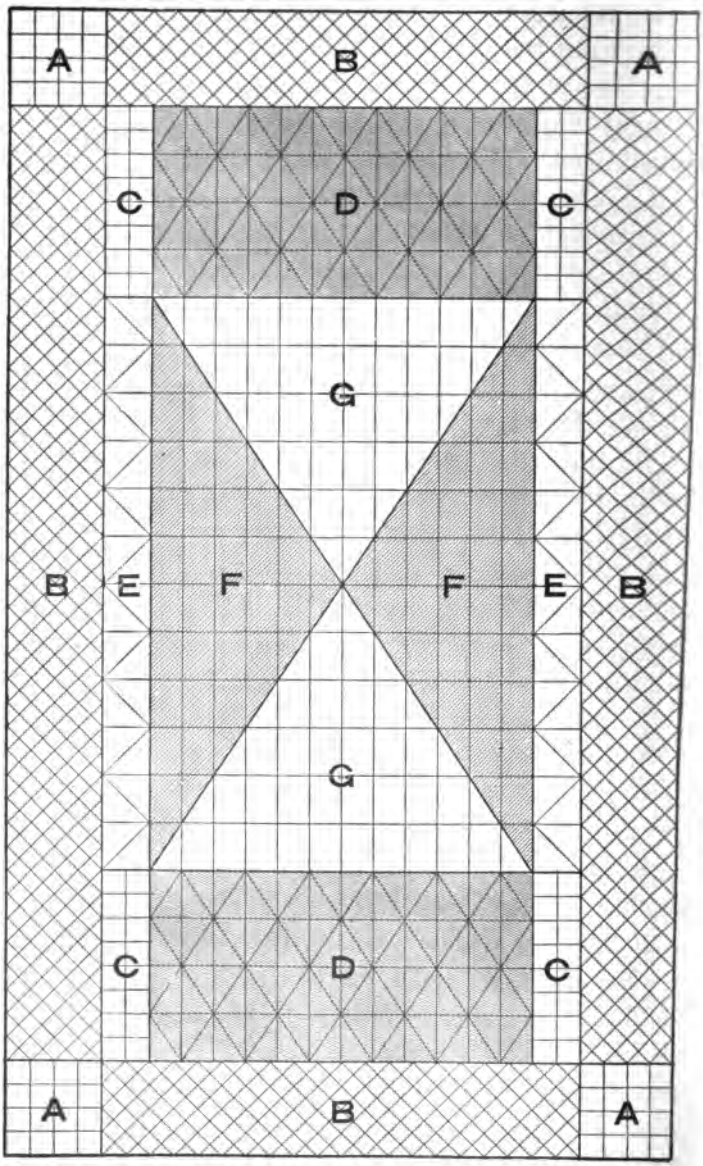
6. What are the dimensions of D? What is the area?

7. What is the area of the triangle, C?

8. Suppose the base of the triangle, C to be 8 feet and the altitude, 8 feet, what is the area of the triangle?

9. The area of such a triangle as C may be found in another way, as shown in figures E and F.

10. Find the middle points of the two sides of triangle, E. Suppose the triangle to be cut through them and the top part equally divided and placed on the sides of the lower part of the triangle, as in the figure F. What kind of figure is thus formed? What are the dimensions? What is the area? What is the area of triangle, E?


A
B
A
C
D
C
G
B
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F
F
E
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D
C
A
B
A

1. Page 252 shows a drawing to the scale, 1 in. to 2 feet. It is the picture of the tiling in a small hall. How long is the hall? How wide is it? What is the area?

2. The cost of tiling the 4 corners, A, was $1.80. How much per square foot was the cost?

3. The cost of tiling one short outside border, B (without the corners), was $2.40. How much was that per square foot? At that rate, what was the cost of tiling the whole outside border, B?

4. The cost of tiling the corners, C, was $1.30 for each corner. Find the cost per square foot? How much was the cost for the 4 corners?

5. How many square feet in D? In the two D's?

6. At 55 cents a square foot, how much did it cost to tile D? The two D's?

7. The cost of tiling one inside border, E, was $2.88. How much was the cost per square foot?

8. What did the tiling for the two E's cost?

9. What is the area of the tiling for F? For G?

10. The cost of tiling F was $2.70. How much was the cost per square foot? At that rate, what was the cost of tiling the two F's?

11. The cost of tiling G was $3.12. How much was the cost per square foot? At that rate, what did it cost to tile the two G's?

12. What was the cost of tiling the two F's and the two G's together?

13. What was the cost of tiling the two E's, the two D's, and the four C's?

14. What was the cost of tiling this whole hall?

A multiplication table for larger numbers than 12 is not needed. This will be seen by the following:

$2\times13=2$ 10's and 2 3's $=20+6=26$

$4\times14=4$ 10's and 4 4's $=40+16=56$

$3\times15=30+15=45$

This work should be done mentally, the pencil being used only to write the final product.

1. Solve mentally:

$3\times13=?$	$6\times13=?$	$9\times13=?$
$4\times13=?$	$7\times13=?$	$10\times13=?$
$5\times13=?$	$8\times13=?$	$11\times13=?$

2. Solve mentally:

$2\times14=?$	$5\times14=?$	$8\times14=?$
$3\times14=?$	$6\times14=?$	$9\times14=?$
$4\times14=?$	$7\times14=?$	$11\times14=?$

3. How many are 26 and 10? 26 and 20? 26 and 30? 36 and 10? 39 and 30? 49 and 30? 49 and 20? 49 and 40? 42 and 20? 42 and 30? 42 and 50? 42 and 40? 65 and 20? 65 and 40? 65 and 30? 65 and 60? 78 and 10? 67 and 10? 78 and 20? 78 and 30? 84 and 10? 84 and 30? 59 and 10?

4. Count by 10's from 13 to 103. From 27 to 127. From 46 to 116. From 87 to 137.

5. Count by 20's from 14 to 134. From 4 to 144. From 33 to 153. From 67 to 167.

6. Count by 30's from 16 to 166. From 9 to 189. From 17 to 197. From 28 to 178.

To add 38 and 23, first add to 38 the 10's in 23, then the 1's, using pencil only to write the last result. Thus, 38 and 20 are 58 and 3 are 61.

1. Solve mentally:

26+13=?	43+15=?	34+14=?
39+13=?	42+14=?	45+15=?
56+14=?	65+13=?	60+15=?
28+14=?	75+15=?	70+14=?
48+16=?	32+16=?	90+15=?
64+16=?	43+16=?	38+15=?

2. Review problem 1, page **254.** 13 equals what part of 52? Of 39? Of 78? Of 91?

3. Review problem 2, p. **254.** 14 equals what part of 42? Of 28? Of 56? Of 84? Of 70? Of 98?

If products like 13×2, and 14×4, are wanted, turn them mentally into 2×13, and 4×14, and then work them the same way as in problems 1 and 2, page **254.**

4. Solve mentally:

13×2=?	13×6=?	14× 8=?
14×2=?	13×4=?	14×10=?
14×3=?	14×4=?	13× 8=?
13×3=?	13×5=?	13× 7=?
14×5=?	14×7=?	13×10=?
14×6=?	13×9=?	14× 9=?
15×3=?	15×4=?	15× 5=?

5. Build the table of 15's as the table of 14's was made in problem 2, page 254.

6. Build the table of 16's the same way.

7. Build the table of 20's.

8. How many stripes in our flag?

9. How many states were there when the number of stars was three times the number of stripes?

10. When will the number of stars be 4 times the number of stripes?

1. 8 times the number of stripes in our flag is the number of years from 1800, until Roosevelt was elected President. In what year was he elected President?

2. From the Declaration of Independence to the World's Fair in Chicago was 9 times as many years as there are stripes in the flag. How many years was it?

3. A man fed his horse $1\frac{1}{2}$ pecks of oats each day for 4 weeks. How many bushels of oats did he feed him?

4. Mr. Jones traveled 195 mi. a day for 2 weeks. How far did he travel in the two weeks?

5. A train ran 14 miles in 30 minutes. How far would it run at the same rate in $2\frac{1}{2}$ hours?

6. A piece of ground 1008 ft. wide is divided into 14 equal strips. What is the width of each strip?

7. A boy bought 3 dozen oranges at the rate of 15¢ a dozen. What did they cost him apiece?

8. A girl bought 12 handkerchiefs at the rate of 2 for 15¢. What did they cost her?

9. Railroad fare for a picnic excursion was 15¢ for the round trip. How much was collected on a train of 9 cars with 65 persons in each car?

10. In a square mile of land there are 16 farms of equal size. How many acres in each (see p. 243)? If one of these farms is divided into 3 fields, two of which contain 16 acres each, what is the area of the third field?

11. From a bin containing 80 lb. of meal, two 8-lb. packages were taken. How many 16-lb. packages can be made from what is left?

12. How many 4-oz. packages can be made from eight 10-lb. packages of spices, allowing 8 oz. for loss in packing? How many 4's in 80 sixteens?

Answer all you can orally.

In the following problems, "at the same rate" is understood.

1. 3 pounds of butter cost 75¢. What is the cost of 4 pounds?

2. At 9 barrels of flour for $45, find the cost of 7 barrels.

3. 5 acres of land cost $250. What is the cost of 7 acres of land?

4. I received $63 for 9 weeks' work. What should I receive for 12 weeks' work?

5. What is the cost of a dozen chairs if $\frac{1}{4}$ of a dozen cost $12?

6. If I pay 4¢ for 10 marbles, what should I pay for 25 marbles?

7. Eggs sell at 30¢ for 2 dozen, what is the cost of $\frac{1}{3}$ of a dozen?

8. A dozen pairs of boots cost $36. What is the cost of 8 such pairs?

9. When 2 gallons of syrup cost $1.50, what is the cost of 3 quarts?

10. A man receives $1200 a year and spends $45 a month. How much does he save the first 6 months? How much does he spend?

11. A piece of string is equal to 6 lengths of an 18-inch rule. How many feet long is it?

12. A man had 30 bushels of wheat, $\frac{2}{3}$ of which he sold at 95¢ a bushel. The remainder he sold at 98¢ a bushel. What did he receive for the entire load?

13. The curtains for a room with 3 windows cost $5. What will they cost for a room with 12 windows?

14. 3 dozen neckties cost $1.80. What is the cost of 4 neckties?

NOTE—In plastering, many contractors make no deductions for windows or doors on account of the extra time necessary to do the work carefully around the frames. In all the problems, therefore, on plastering, unless otherwise stated, the walls are counted as solid.

1. A room is 9 ft. by 21 ft. and 9 ft. high. How many sq. yd. in the walls? In the ceiling? What will it cost to plaster the walls and ceiling at 21¢ a square yard?

2. A room is 12 feet square and 10 feet high. What will it cost to plaster the walls and ceiling at 23¢ per square yard?

3. What will be the cost of plastering the walls of a room 9 by 12 feet and 9 feet high at 45¢ a square yard?

4. What will be the cost of plastering the ceiling of a room 24 feet square at 28¢ a square yard?

5. Mr. Jones wishes to plaster the walls and ceilings of 3 rooms. The first room is 9 by 12 ft., the second 12 by 15 ft., and the third 15 by 18 feet. The height of each room is 9 feet. What will be the cost of plastering the three rooms at 28¢ a square yard?

6. What would be the cost of enough carpet a yard wide for the three rooms at 75¢ a yard?

7. The floor of a room contains 324 square feet. One side of it is 4 yards long. How many yards long is the other side?

8. The 4 walls of a square room 8 feet high contain 384 square feet. What is the length and the width of the room?

9. What is the length of a wall 12 feet high the area of whose side is 3 times 264 square feet?

10. A room is 10 feet wide and $11\frac{1}{2}$ feet long. A rug on the floor is $2\frac{1}{2}$ yards wide and 3 yards long. How much of the floor is not covered by the rug?

1. Solve mentally:

(1) $23+10=?$ (5) $54+20=?$ (9) $47+50=?$
(2) $47+20=?$ (6) $65-20=?$ (10) $74-40=?$
(3) $54-10=?$ (7) $83-30=?$ (11) $67+30=?$
(4) $65+20=?$ (8) $63+30=?$ (12) $97-63=?$

2. Solve mentally, by adding, or subtracting the 10's, then the 1's:

(1) $36+12=?$ (5) $67-34=?$ (9) $65-44=?$
(2) $46+23=?$ (6) $55+24=?$ (10) $87-43=?$
(3) $57+32=?$ (7) $55+34=?$ (11) $62+37=?$
(4) $74-22=?$ (8) $65-34=?$ (12) $68-47=?$

3. Solve mentally, as rapidly as you can give results correctly; first adding, or subtracting the 10's, then the 1's:

(1) $38+22=?$ (5) $38-22=?$ (9) $65-17=?$
(2) $38+32=?$ (6) $45+16=?$ (10) $65-27=?$
(3) $38+43=?$ (7) $45+26=?$ (11) $62+28=?$
(4) $38+54=?$ (8) $45+37=?$ (12) $62+38=?$

4. How many 2's in 4? How many 2's in 2 fours? In 3 fours? In 4 fours? In 5 4's? In 6 4's?

5. How many 4's in 8? In 2 8's? In 3 8's? In 4 8's? In 6 8's? In 7 8's? In 10 8's?

6. How many 3's in 6? In 2 6's? In 3 6's? In 5 6's? In 7 6's? In 12? In 2 12's? In 3 12's?

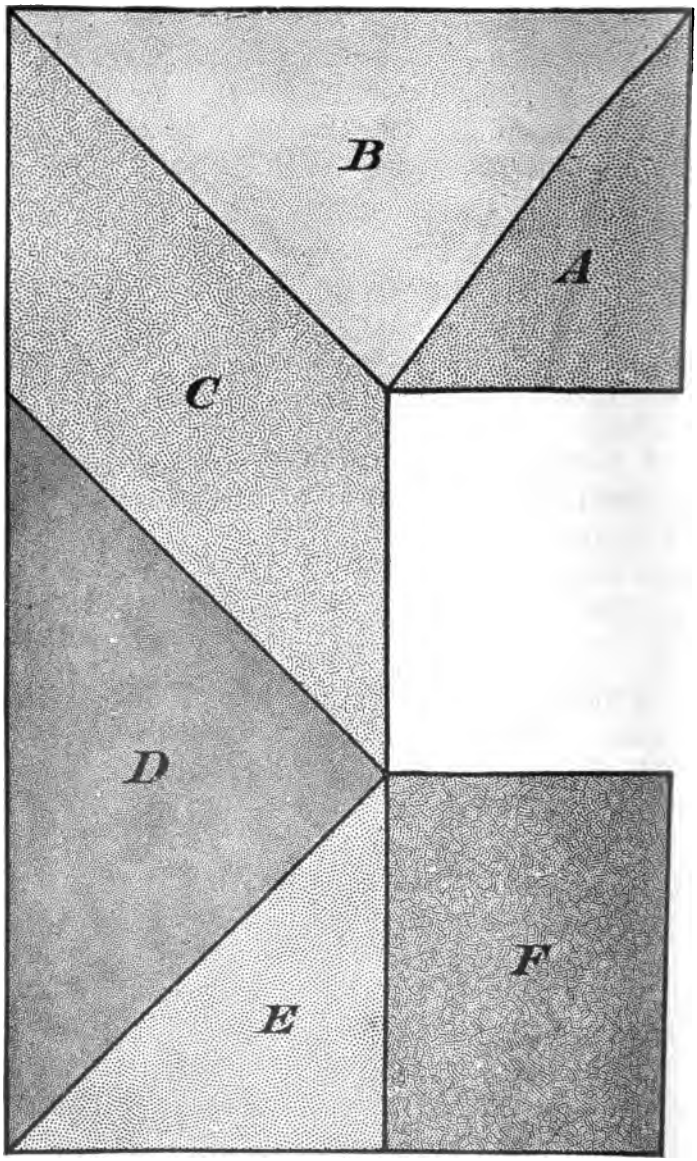
7. How many 5's in 10? In 2 10's? In 3 10's? In 4 10's? In 15? In 2 15's? In 5 15's?

8. How many 6's in 12? In 2 12's? In 3 12's? In 5 12's? In 18? In 2 18's? In 3 18's?

9. How many 8's in 24? In 2 24's? In 4 24's?

10. How many 7's in 14? In 2 14's? In 3 14's?

11. How many 8's in 40? In 2 40's? In 5 40's?


B
A
C
D
F
E

The plan on the opposite page represents a garden, which has been cut into various parts by the walks running through it. The plan is drawn to the scale of 1 inch to 10 feet.

1. Measure the line around the entire plan and find the length of the path around the garden.

2. How many square feet does A represent? B? C?

3. How many square feet does D represent? E? F?

4. How many square feet are there in the entire garden?

5. A is what part of B? Of C? Of D? Of E? Of F?

6. F is what part of the entire garden?

7. How did you find the area of C?

8. How did you find the area of D?

9. In what other ways beside finding the areas of the triangles could you find the area of the entire garden?

Suppose the plan on the opposite page, representing a piece of land, is drawn to a scale of 1 inch to 8 rods.

10. What is the value of A at 25¢ a square rod?

11. What is the value of B at 30¢ a square rod?

12. What is the value of C at 28¢ a square rod?

13. What is the value of D at 27¢ a square rod?

14. What is the value of E at 26¢ a square rod?

15. What is the value of F at 29¢ a square rod?

16. How many sq. rd. in the entire field?

17. How many acres?

18. How many sq. yd. in A?

19. How many sq. yd. in B?

20. How many sq. yd. in C?

21. How many sq. yd. in D?

22. How many sq. yd. in E?

23. How many sq. yd. in F?

1. A woman who raises chickens put 13 eggs under each of 6 hens. The first hatched out all but 1, the second all but 2, the third all but 3, the fourth all but 4, and the others all but 5 each. How many chickens were hatched?

2. How many pigeons will it take to pick up a bushel of corn (56 lb.) if each one picks up 4 ounces?

3. A man buys 12 tons of hay for $80 and sells it for 60¢ per cwt. How much does he make?

4. An expressman receives $3.25 per day for 30 days. It costs him 30¢ per day to feed his horse, and $4.20 for repairs to his wagon. How much has he left?

5. An express company carries 400 packages at 15¢ each; 28 trunks at 50¢ each, and 12 bicycles at 40¢ each. How much does the company get for all?

6. There are 40 street cars on one line and each can carry 60 people. How many people do they all carry in 12 round trips if $\frac{1}{2}$ carry their full number each way and the remainder carry 30 persons each way?

7. A baker has 400 loaves of bread. He sells $\frac{3}{4}$ at 5¢ per loaf, 60 loaves at 4¢, and gives the rest away. How much does he get for the bread?

8. How many sheep must there be to produce a ton of wool if the wool from each sheep weighs 4 pounds? If each sheep produces 5 pounds?

9. A farmer raised 840 bu. of potatoes on 5 acres of land. What was the average value of the potato crop per acre at 40¢ per bushel?

10. A man set out 12,000 cabbage plants, but $\frac{1}{6}$ of them died and $\frac{1}{10}$ of the remainder were blighted. What did he receive for the rest at $3 per hundred?

1. An orchard of 600 trees produced 3 bbl. of apples to the tree. The owner sold them at \$1.40 per bbl., but the barrels cost him 25¢ each. What did he get for the apples after paying for the barrels?

2. An orchard produced 210 bu. of peaches. If 1 bu. fills 5 baskets, what is the value of the crop at 20¢ a basket?

3. A man pays 1¢ per box for picking berries, and $\frac{1}{4}$¢ each for boxes. If he sells 1000 boxes of berries for \$60.00, what is his profit?

4. A boy's pay for a week's work at berry-picking at 1¢ per box was \$5.40. How many boxes did he pick daily during the six days if he picked the same number each day?

5. A farmer sells 1000 boxes of berries to a city grocer at 6¢ a box. The grocer pays \$5.00 to get them to the city and sells them at 8¢ a box. What is his gain?

6. A woman who kept chickens bought 12 bu. of feed for them at 35¢ per bu. She sold 120 doz. eggs at $12\frac{1}{2}$¢ a doz. and 40 chickens at 25¢ each. How much more did she receive than she paid out?

7. How many chickens averaging 5 lb. each and worth 6¢ per lb. can be bought for \$75?

8. If 15 chickens are worth as much as 1 sheep, and 6 sheep are worth as much as 1 cow costing \$28.80, what is 1 chicken worth?

9. A carpenter builds a fence for \$56. The lumber costs him \$15 and he pays each of three men \$2.75 per day for 4 days. What is his share of the \$56?

10. A man earns \$1.50 every day he works and pays 50¢ a day for his board. If he works only 16 days during the month of May, how much has he left after paying his board for the whole month?

BEET-SUGAR PRODUCTION OF THE UNITED STATES

STATE	1903			1902		
	Factories	Acres Sown	*Tons of Sugar	Factories	Acres Sown	*Tons of Sugar
New York	2	7,000	4,479	2	6,500	2,799
Wisconsin	1	5,800	4,911	1	3,400	3,463
Ohio	1	2,500	2,002	1	2,450	1,473
Michigan	20	117,100	57,064	16	98,000	48,848
Minnesota	1	3,800	3,125	1	4,500	3,054
Nebraska	3	11,400	8,669	3	9,980	9,430
Colorado	8	52,800	39,566	5	39,449	34,623
Utah	7	18,700	20,670	6	18,600	16,987
Oregon	1	1,800	1,250	1	3,100	2,025
Washington	1	4,400	2,213	1	2,300	1,641
Idaho	1	5,300	3,571			
California	7	62,195	60,608	7	71,234	71,120

*Ton = the long ton of 2240 pounds.

1. Find for 1902 the total number of factories; of acres sown; and of tons of sugar. Find the same for 1903.

2. Find for each state from 1902 to 1903 the increase or decrease of factories; of tons of sugar; of acres sown.

3. Find total increase from 1902 to 1903 of factories; of tons of sugar; of acres sown.

4. Find the average number of tons of sugar, and of acres sown for each New York factory in 1902. In 1903.

5. Find similar averages for Colorado. For Michigan.

6. In Kansas the total yields for each year from 1901 to 1906 of beets used for sugar, were: 1747 tons, 4251 tons, 696 tons, 6380 tons, 8606 tons, and 70,200 tons. Find the yearly increase or decrease.

7. The ton of problem 6 is the short ton of 2000 pounds. Express the results in pounds. In long tons.

8. Make other problems on the table. Current newspaper prices of sugar will suggest original problems.

	Born	Died
Paul Revere	Jan. 1, 1735	1818
Benj. Franklin	Jan. 17, 1706	1790
Wm. McKinley	Jan. 29, 1843	1901
George Bancroft	Oct. 3, 1800	1891
Abraham Lincoln	Feb. 12, 1809	1865
Charles Dickens	Feb. 7, 1812	1870
Geo. Washington	Feb. 22, 1732	1799
James R. Lowell	Feb. 22, 1819	1891
H. W. Longfellow	Feb. 27, 1807	1882
Andrew Jackson	Mar. 15, 1767	1845
Rosa Bonheur	Mar. 22, 1828	1899
Hans C. Anderson	April 2, 1805	1875
Washington Irving	April 3, 1783	1859
W. H. Prescott	May 4, 1796	1859
Audubon	May 4, 1780	1851
Queen Victoria	May 24, 1819	1901
Patrick Henry	May 29, 1736	1799

1. What is the month and day of your birth?

2. In what year were you born?

3. How old are you to-day?

4. Find how many years each person in the above table lived.

5. Which was the older, and how much older, George Bancroft or Washington Irving? James Russell Lowell or Henry W. Longfellow? Abraham Lincoln or Patrick Henry?

6. How many years ago (now) was each person born?

7. The birthday of William McKinley occurs how many days after that of Benjamin Franklin?

8. The birthday of Henry W. Longfellow occurs how many days before that of Andrew Jackson?

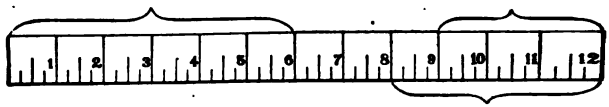
9. How many days between George Washington's birthday and that of Patrick Henry?

10. How many years, months, and days have passed since Queen Victoria was born?

11. Answer the same question for Benjamin Franklin; James Russell Lowell; Rosa Bonheur.

12. Longfellow wrote the Psalm of Life in 1838; Evangeline in 1847; Hiawatha in 1855. How old was he at the time of writing these poems?

13. Make problems using the dates of births of pupils in your class.



FOOT-RULE TO A SCALE OF 3 TO 12, OR $\frac{1}{4}$.

Answer all you can orally.

1. What part of a foot is 6 inches? 3 inches? 4 inches? 9 inches? 2 inches?

2. What part of a foot is 1 inch? 8 inches? 10 inches? 5 inches? 7 inches?

3. What part of a quart is a pint? What part of a pint is a gill? 2 gills? 3 gills?

4. What part of a yard is a foot? 2 feet? 3 feet? 4 feet? 5 feet? 6 feet?

5. What part of a gallon is a quart? 2 quarts? 3 quarts? 4 quarts? 5 quarts?

6. What part of a bushel is a peck? 2 pecks? 3 pecks? 4 pecks? 5 pecks?

7. What part of a gallon is a pint? 2 pints? 3 pints? 4 pints? 5 pints? 6 pints?

8. What part of a peck is a quart? 2 quarts? 3 quarts? 4 quarts? 5 quarts? 6 quarts?

9. What part of a yard is 6 inches? 3 inches? 2 inches? 1 inch? 12 inches? 24 inches?

10. What part of 36 is 6? 3? 2? 12? 18? 4? 9?

11. What part of a bushel is a quart? 2 quarts? 4 quarts? 8 quarts? 16 quarts?

12. What part of 32 is 2? 4? 6? 8? 16? 12?

13. What part of a bushel is a pint? 2 pints? 4 pints? 8 pints? 16 pints? 32 pints?

14. What part of 64 is 32? 16? 8? 4? 2? 24? 40? 48? 56?

1. What part of a square yard is a square foot? 2 square feet? 3 square feet? 4 square feet? 5 square feet? 6 square feet? 7 square feet? 8 square feet? 9 square feet? 10 square feet?

2. What part of a week is a day? 2 days? 3 days? 4 days? 5 days? 6 days? 7 days?

3. What part of June is 1 day? 2 days? 3 days? 4 days? 5 days? 6 days? 7 days? 10 days? 15 days? 20 days? 25 days? 24 days?

4. What part of 30 is 15? 10? 5? 3? 2? 4? 6? 12? 20? 25? 24?

5. What part of a year is a month? 6 months? 3 months? 4 months? 5 months? 8 months? 9 months? 7 months? 11 months?

6. What part of 12 is 6? 4? 3? 2? 8? 9? 10? 5? 7?

7. How many weeks are there in a year? (Ans., 52.)

8. What part of a year is 26 weeks? 13 weeks? $6\frac{1}{2}$ weeks? 1 week? 4 weeks? 12 weeks?

9. What part of 52 is 26? 13? 2? 4? 1? $6\frac{1}{2}$? $3\frac{1}{4}$?

10. What part of 24 is 12? 3? 4? 6? 2? 8? 1? 5? 9?

11. What part of 100 is 50? 25? 20? 10? 5? 75? 80? 40? $12\frac{1}{2}$? $33\frac{1}{3}$?

12. How many minutes make 1 hour?

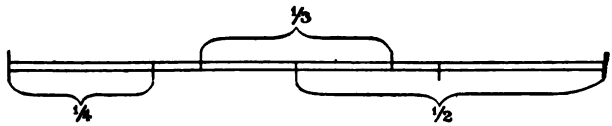
13. What part of an hour is 30 minutes? 20 minutes? 15 minutes? 10 minutes? 6 minutes? 40 minutes? 12 minutes? 24 minutes?

14. What part of 60 is 30? 20? 15? 10? 6? 40? 12? 24?

15. How many yards make 2 rods? 6 rods? 10 rods?

16. What part of 2 rods is 1 yard? 3 yards? 6 yards? 9 yards? 10 yards?

17. What part of 11 is 1? 3? 6? 9? 10?



1. Show from the drawing that $\frac{2}{2} = 1$ whole, or 1.

2. Show from the drawing that $\frac{3}{3} = 1$; that $\frac{4}{4} = 1$.

3. Show that $\frac{2}{4} = \frac{1}{2}$; that $\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{4}$; that $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$.

4. Show that $\frac{1}{2}$ of $\frac{1}{3} = \frac{1}{6}$; that $\frac{1}{2}$ of $\frac{2}{3} = \frac{1}{3}$.

5. Show that $\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$; that $\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$.

6. Show that $\frac{1}{3} - \frac{1}{6} = \frac{1}{6}$; that $\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$.

7. Show that $1 - \frac{1}{2} = \frac{1}{2}$; that $1 - \frac{1}{3} = \frac{2}{3}$; that $1 - \frac{2}{3} = \frac{1}{3}$.

8. Show that $1 - \frac{1}{4} = \frac{3}{4}$; that $1 - \frac{2}{4} = \frac{1}{2}$; that $1 - \frac{3}{4} = \frac{1}{4}$.

9. Show that $1 - \frac{2}{2} = 0$; that $1 - \frac{3}{3} = 0$; that $1 - \frac{4}{4} = 0$.

10. Show, by dividing a line into equal parts, that $\frac{1}{2} = \frac{4}{8}$; that $\frac{1}{4} = \frac{2}{8}$; that $\frac{3}{4} = \frac{6}{8}$.

11. Show, by the same divided line, that $\frac{1}{2}$ of $\frac{1}{4} = \frac{1}{8}$; that $\frac{1}{4}$ of $\frac{1}{2} = \frac{1}{8}$.

12. Show that $\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$; that $\frac{1}{2} - \frac{1}{8} = \frac{3}{8}$; that $\frac{3}{4} - \frac{1}{8} = \frac{5}{8}$.

13. Show that $\frac{3}{4} - \frac{3}{8} = \frac{3}{8}$; that $\frac{1}{2} - \frac{3}{8} = \frac{1}{8}$; that $\frac{3}{4} - \frac{1}{8} = \frac{5}{8}$.

14. In $\frac{2}{4}$, divide both the 2 and the 4 by 2, and make a fraction of the results. How does this fraction compare with $\frac{2}{4}$? Which fraction seems the simpler, $\frac{2}{4}$, or $\frac{1}{2}$?

15. In $\frac{3}{6}$, divide both the 3 and the 6 by 3, and tell how the fraction, made from the results, compares with $\frac{3}{6}$. Which fraction seems the simpler, $\frac{3}{6}$, or $\frac{1}{2}$?

1. In $\frac{4}{8}$, divide both the 4 and the 8 by 2, and tell how the fraction, made from the results, compares with $\frac{4}{8}$. Which seems the simpler, $\frac{4}{8}$, or $\frac{2}{4}$?

2. In $\frac{4}{8}$, divide both the 4 and the 8 by 4, and tell how the fraction, made from the results, compares with $\frac{4}{8}$.

3. In $\frac{6}{8}$, divide both the 6 and the 8 by 2, and tell how the fraction, made from the results, compares with $\frac{6}{8}$.

4. Divide both the 9 and the 12 of $\frac{9}{12}$ by 3 and tell how the fraction, made from the results, compares with $\frac{9}{12}$. Which is the simpler, $\frac{9}{12}$ or $\frac{3}{4}$?

5. Divide both the 10 and the 15 of $\frac{10}{15}$ by 5, and tell how the fraction, made from the results, compares with $\frac{10}{15}$. Which is the simpler, $\frac{10}{15}$ or $\frac{2}{3}$?

6. Divide both the 18 and the 24 of $\frac{18}{24}$ by 6, and tell how the fraction, made from the results, compares with $\frac{18}{24}$. Which is the simpler, $\frac{18}{24}$ or $\frac{3}{4}$?

7. How may a fraction, expressed with larger numbers, sometimes be expressed as a fraction with smaller numbers, *without changing its value*?

8. Express in smaller numbers the following fractions:

$\frac{2}{8}$ $\frac{4}{6}$ $\frac{3}{9}$ $\frac{4}{12}$ $\frac{3}{12}$ $\frac{4}{10}$ $\frac{6}{12}$ $\frac{9}{12}$ $\frac{10}{12}$ $\frac{7}{14}$ $\frac{3}{15}$ $\frac{5}{15}$ $\frac{5}{10}$

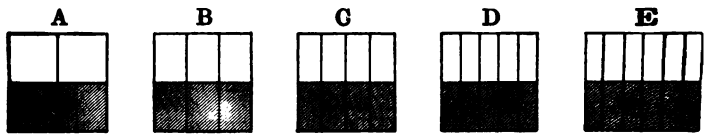
9. Express the following fractions in small numbers:

$\frac{8}{12}$ $\frac{12}{14}$ $\frac{9}{18}$ $\frac{9}{27}$ $\frac{18}{27}$ $\frac{15}{20}$ $\frac{10}{20}$ $\frac{14}{21}$ $\frac{14}{28}$ $\frac{21}{28}$ $\frac{18}{24}$ $\frac{20}{30}$

Fractions are in their *simplest form*, or in their *lowest terms*, when the numbers above and below the line are the smallest possible whole numbers.

10. $\frac{10}{12}$ $\frac{12}{24}$ $\frac{16}{24}$ $\frac{25}{30}$ $\frac{30}{40}$ $\frac{35}{40}$ $\frac{50}{100}$ $\frac{25}{100}$ $\frac{75}{100}$

Express the fractions above in their lowest terms.



1. What part of A is $\frac{1}{2}$ of $\frac{1}{2}$ of A?

2. What part of B is $\frac{1}{2}$ of $\frac{1}{3}$ of B? $\frac{1}{3}$ of $\frac{1}{2}$ of B? $\frac{1}{2}$ of $\frac{2}{3}$ of B? $\frac{2}{3}$ of $\frac{1}{2}$ of B?

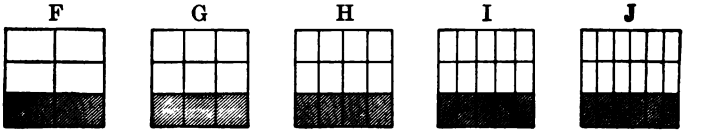
3. What part of C is $\frac{1}{2}$ of $\frac{1}{4}$ of C? $\frac{1}{4}$ of $\frac{1}{2}$ of C? $\frac{1}{2}$ of $\frac{3}{4}$ of C? $\frac{3}{4}$ of $\frac{1}{2}$ of C?

4. What part of D is $\frac{1}{2}$ of $\frac{1}{5}$ of D? $\frac{1}{5}$ of $\frac{1}{2}$ of D? $\frac{1}{2}$ of $\frac{3}{5}$ of D? $\frac{3}{5}$ of $\frac{1}{2}$ of D?

5. What part of E is $\frac{1}{2}$ of $\frac{1}{6}$ of E? $\frac{1}{6}$ of $\frac{1}{2}$ of E? $\frac{1}{2}$ of $\frac{5}{6}$ of E? $\frac{5}{6}$ of $\frac{1}{2}$ of E?

6. Show from A, B, C, D, and E that—

$\frac{1}{2} = \frac{2}{4}$ $\frac{1}{2} = \frac{3}{6}$ $\frac{1}{2} = \frac{4}{8}$ $\frac{1}{2} = \frac{5}{10}$ $\frac{1}{2} = \frac{6}{12}$



7. What part of F is $\frac{1}{3}$ of $\frac{1}{2}$ of F? $\frac{1}{2}$ of $\frac{1}{3}$ of F?

8. What part of G is $\frac{1}{3}$ of $\frac{1}{3}$ of G?

9. What part of H is $\frac{1}{3}$ of $\frac{1}{4}$ of H? $\frac{1}{4}$ of $\frac{1}{3}$ of H? $\frac{1}{3}$ of $\frac{3}{4}$ of H? $\frac{3}{4}$ of $\frac{1}{3}$ of H?

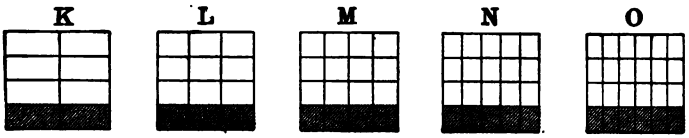
10. What part of I is $\frac{1}{3}$ of $\frac{1}{5}$ of I? $\frac{1}{5}$ of $\frac{1}{3}$ of I? $\frac{1}{3}$ of $\frac{2}{5}$ of I? $\frac{2}{5}$ of $\frac{1}{3}$ of I?

11. What part of J is $\frac{1}{3}$ of $\frac{1}{6}$ of J? $\frac{1}{6}$ of $\frac{1}{3}$ of J? $\frac{1}{3}$ of $\frac{5}{6}$ of J? $\frac{5}{6}$ of $\frac{1}{3}$ of J?

12. Show from F, G, H, I, and J that—

$\frac{1}{3} = \frac{2}{6}$ $\frac{1}{3} = \frac{3}{9}$ $\frac{1}{3} = \frac{4}{12}$ $\frac{1}{3} = \frac{5}{15}$ $\frac{1}{3} = \frac{6}{18}$

$\frac{2}{3} = \frac{4}{6}$ $\frac{2}{3} = \frac{6}{9}$ $\frac{2}{3} = \frac{8}{12}$ $\frac{2}{3} = \frac{10}{15}$ $\frac{2}{3} = \frac{12}{18}$



1. What part of K is $\frac{1}{4}$ of $\frac{1}{2}$ of K? $\frac{1}{2}$ of $\frac{1}{4}$ of K?

2. What part of L is $\frac{1}{4}$ of $\frac{1}{3}$ of L? $\frac{1}{3}$ of $\frac{1}{4}$ of L? $\frac{1}{4}$ of $\frac{2}{3}$ of L? $\frac{2}{3}$ of $\frac{1}{4}$ of L?

3. What part of M is $\frac{1}{4}$ of $\frac{1}{4}$ of M?

4. What part of N is $\frac{1}{4}$ of $\frac{1}{5}$ of N? $\frac{1}{5}$ of $\frac{1}{4}$ of N? $\frac{1}{4}$ of $\frac{3}{5}$ of N? $\frac{3}{5}$ of $\frac{1}{4}$ of N?

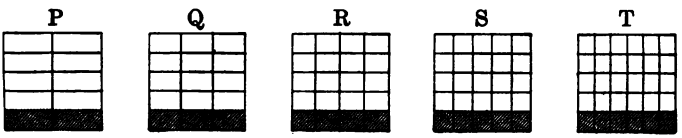
5. What part of O is $\frac{1}{4}$ of $\frac{1}{6}$ of O? $\frac{1}{6}$ of $\frac{1}{4}$ of O? $\frac{1}{4}$ of $\frac{5}{6}$ of O? $\frac{5}{6}$ of $\frac{1}{4}$ of O?

6. Show from K, L, M, N, and O that—

$\frac{1}{4} = \frac{2}{8}$ $\frac{1}{4} = \frac{3}{12}$ $\frac{1}{4} = \frac{4}{16}$ $\frac{1}{4} = \frac{5}{20}$ $\frac{1}{4} = \frac{6}{24}$

$\frac{1}{2} = \frac{4}{8}$ $\frac{1}{2} = \frac{6}{12}$ $\frac{1}{2} = \frac{8}{16}$ $\frac{1}{2} = \frac{10}{20}$ $\frac{1}{2} = \frac{12}{24}$

$\frac{3}{4} = \frac{6}{8}$ $\frac{3}{4} = \frac{9}{12}$ $\frac{3}{4} = \frac{12}{16}$ $\frac{3}{4} = \frac{15}{20}$ $\frac{3}{4} = \frac{18}{24}$



7. What part of P is $\frac{1}{5}$ of $\frac{1}{2}$ of P? $\frac{1}{2}$ of $\frac{1}{5}$ of P?

8. What part of Q is $\frac{1}{5}$ of $\frac{1}{3}$ of Q? $\frac{1}{3}$ of $\frac{1}{5}$ of Q?

9. What part of R is $\frac{1}{5}$ of $\frac{1}{4}$ of R? $\frac{1}{4}$ of $\frac{1}{5}$ of R?

10. What part of S is $\frac{1}{5}$ of $\frac{1}{5}$ of S?

11. What part of T is $\frac{1}{5}$ of $\frac{1}{6}$ of T? $\frac{1}{6}$ of $\frac{1}{5}$ of T?

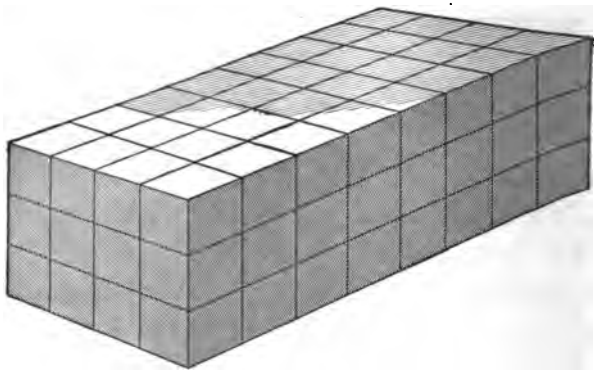
12. Show from P, Q, R, S, and T that—

$\frac{1}{5} = \frac{2}{10}$ $\frac{1}{5} = \frac{3}{15}$ $\frac{1}{5} = \frac{4}{20}$ $\frac{1}{5} = \frac{5}{25}$ $\frac{1}{5} = \frac{6}{30}$

$\frac{2}{5} = \frac{4}{10}$ $\frac{2}{5} = \frac{6}{15}$ $\frac{2}{5} = \frac{8}{20}$ $\frac{2}{5} = \frac{10}{25}$ $\frac{2}{5} = \frac{12}{30}$

$\frac{3}{5} = \frac{6}{10}$ $\frac{3}{5} = \frac{9}{15}$ $\frac{3}{5} = \frac{12}{20}$ $\frac{3}{5} = \frac{15}{25}$ $\frac{3}{5} = \frac{18}{30}$

$\frac{4}{5} = \frac{8}{10}$ $\frac{4}{5} = \frac{12}{15}$ $\frac{4}{5} = \frac{16}{20}$ $\frac{4}{5} = \frac{20}{25}$ $\frac{4}{5} = \frac{24}{30}$



1. In the lower layer of cubic blocks in this solid, how many rows of 4 blocks each? How many blocks in the layer? How is this found? In all 3 layers, or the entire solid, how many blocks are there? How is this found? How then are the number of cubic units in any square-cornered solid found?

2. How many inch cubes are there in a block 2 inches long, 2 inches wide, and 1 inch high? How many inch cubes are there in a block 4 inches long, 2 inches wide, and 1 inch high?

3. How many inch cubes are there in a block 6 inches long, 4 inches wide, and 1 inch high? How many inch cubes are there in one row? How many of these rows are there in the block?

4. How many cubic inches are there in a box that is 4 inches long, 3 inches wide, and 1 inch high? 2 inches high? 3 inches high?

5. How many cubic inches are there in a box 4 inches long, 2 inches wide, and 2 inches high?

6. A block is 5 inches long, 2 inches wide, and 3 inches high. How many cubic inches are there in it?

1. A pencil box containing 24 cubic inches is 3 inches wide and 1 inch high. How long is it?

2. A block is 3 feet long, 3 feet wide, and 3 feet high. How many cubic feet does it contain? What is the area of one side of such a block in square feet? In square yards? How many cubic yards in a block 1 yard long, 1 yard wide, and 1 yard high? How many cubic feet in such a block?

3. A room is 5 yards wide, 7 yards long, and 4 yards high. How many cubic yards are there in the room?

4. A cellar is 7 yards long, 6 yards wide, and 3 yards deep. How many cubic yards of earth were taken out in digging the cellar?

5. The foundation wall of one side of a building is 65 feet long, 4 feet high and $1\frac{1}{2}$ feet wide. How many cubic feet does it contain?

6. A box is 7 feet long, 3 feet wide, and contains 63 cubic feet. How high is it?

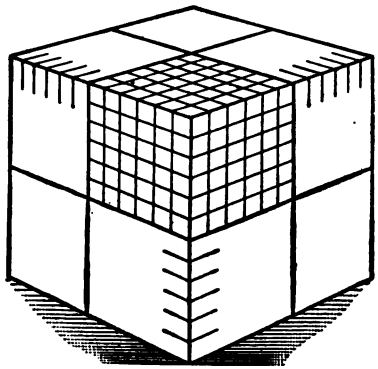
7. A bin is 3 feet wide, 4 feet high, and contains 72 cubic feet. How long is it?

8. A coal-bin is 12 feet long, 6 feet wide, and 7 feet high. How many cubic feet of coal will it hold?

9. A car is 40 feet long, $8\frac{1}{2}$ feet wide, and 8 feet high. How many cubic yards does it contain?

10. A man has 4 bins, each 5 feet long, 4 feet wide, and 3 feet high. How many cubic feet of coal will they all hold?

11. One box is 4 feet long, 3 feet wide, and 2 feet high. A second is 5 feet long, 3 feet wide, and 2 feet high. A third is 6 feet long, 5 feet wide, and 4 feet high. How many cubic feet are there in the 3 boxes?



1. How many edges d you see on this block How many edges has it

2. If the edges were a 1 inch long, what woul such a block be called?

3. If 12 such cubes ar placed in a row, how lon is the row?

4. If 12 of these rows are placed side by side, how wide is the whole? How many cubes are used?

5. What figure would the upper surface of the cubes form?

6. How many square inches would there be in this surface? How many inch-cubes would you use in forming this layer?

7. If you should place another layer of cubes on those already used, how many cubic inches would you have? How many, if you used 3 layers? 4 layers? 5 layers? 6 layers? 7 layers?

8. The picture represents 12 layers of inch-cubes. Each layer contains 12 rows of 12 cubes each. How long is each edge? What would you call such a cube? How many cubic inches would it contain?

9. If you should divide one-half of this cube into 4 equal cubes, what would each cube measure?

10. What part of the whole cube would each be?

11. How many cubic inches are there in each part?

12. How many cubic inches in three-eighths of a cubic foot? In seven-eighths? In one-fourth?

1. A berry box is 6 inches long, 4 inches wide, and 4 inches deep. How many such boxes can be packed in a case 2 ft. long, 1 ft. wide, and $\frac{2}{3}$ of a foot high?

2. A gallon contains 231 cubic inches. How many gallons can be put into a pail holding 693 cubic inches?

3. How many boxes 12 inches long, 6 inches wide, and 3 inches high can be packed in a case 6 feet long, 4 feet wide, and 4 feet high?

4. How many cubic feet of air will a glass tank hold, that is 24 inches long, 18 inches wide, and 12 inches high?

5. From a vessel holding 2 cubic feet of water 864 cubic inches were taken. How many cubic inches remain? How many cubic feet?

6. There are 864 cubic inches of liquid in one tank; 2592 cubic inches in another. How many cubic feet in a third tank, holding as much as both together?

7. A man put sand 12 in. deep into a box 9 ft. long and 5 ft. wide. How many cu. ft. of sand were in the box?

8. A wagon box, 3 feet wide and 9 feet long, is $1\frac{1}{3}$ feet deep. How many cubic feet does it hold?

9. A ditch 45 feet long and 2 feet wide contains 630 cubic feet. How deep is the ditch?

10. A freight car is 32 feet long and 6 feet wide inside and is filled with sand $3\frac{3}{4}$ feet deep. How many cubic feet of sand are in the car?

11. A wall is 44 feet long, $5\frac{1}{2}$ feet high, and 18 inches thick. How many cubic feet in the wall?

12. A sidewalk is 6 inches thick and 6 feet wide. How many cubic feet in 124 feet of the sidewalk?

13. In a building there are 18 pillars, 2 ft. by 18 in. and 14 ft. high. How many cubic feet in these pillars?

TABLE OF CUBIC MEASURE

1728	cu. in. (cubic inches)	= 1 cu. ft. (cubic foot).
27	cu. ft. (cubit feet)	= 1 cu. yd. (cubic yard).
128	cu. ft.	= 1 cord (cd.)
231	cu. in.	= 1 gal.
2150½	cu. in. (nearly)	= 1 bu.

1. Add:

7 cu. yd.	6 cu. ft.	27 cu. in.	6 cu. yd.	14 cu. ft.	55 cu. in.
2	10	250	2	2	17
4	2	41	3	3	40

2. Add:

8 cu. yd.	5 cu. ft.	27 cu. in.	1 cu. yd.	5 cu. ft.	160 cu. in.
3	4	144	8	14	750
20	10	75	4	7	818

3. Add:

7 cu. yd.	5 cu ft.	150 cu. in.	7 cu. yd.	26 cu. ft.	600 cu. in.
5	10	364	3	24	420
3	14	225	2	12	708
2	3	600	9	17	800

4. Subtract:

10 cu. yd.	25 cu. ft.	120 cu. in.	9 cu. yd.	18 cu. ft.	350 cu. in.
6	16	90	5	9	275

5. Subtract:

14 cu. yd.	20 cu. ft.	800 cu. in.	11 cu. yd.	15 cu. ft.	920 cu. in.
7	13	246	6	7	256

6. Multiply:

6 cu. yd.	7 cu. ft.	576 cu. in.	12 cu. yd.	6 cu. ft.	1296 cu. in.
		3			4

1. A boy cut enough wood to make a pile 4 ft. long, 2 ft. wide, and 2 ft. high. What part of a cord did he cut?

2. What must be the cubic contents of a jar to hold $\frac{2}{3}$ of a gallon? $2\frac{1}{3}$ gal.? $4\frac{4}{7}$ gallons?

3. How many cubic inches are there in a box holding 2 bu.? $\frac{1}{2}$ bu.? $5\frac{1}{3}$ bu.? $4\frac{1}{8}$ bu.? $6\frac{1}{4}$ bushels?

4. A cord of wood is usually piled 8 ft. long and 4 ft. wide. How high is it?

5. A box holds 16 bu. How many cubic inches does it contain?

6. How many cu. yd. of earth must be dug out to make a cellar, 24 ft. long, 21 ft. wide, and 12 ft. deep?

7. In making a cellar 36 ft. long and 18 ft. wide, 6804 cu. ft. of earth were taken. How deep was the cellar?

8. How many cu. yd. of earth were taken from a tunnel that is $9\frac{1}{2}$ ft. high, 80 ft. long, and $12\frac{1}{2}$ ft. wide?

9. A cubic foot of water weighs 1000 ounces. What is the weight in pounds of water enough to fill a trough 6 ft. long, 2 ft. wide, and $1\frac{1}{2}$ ft. deep?

10. Oil weighs $\frac{4}{5}$ as much as water. What is the weight in pounds of a cubic foot of oil?

11. A street sprinkler holds 168 cu. ft. of water. How many pounds does it hold?

12. Such a street sprinkler is emptied every 24 minutes during 9 hours. How many buckets of water are used if a bucket holds $\frac{1}{3}$ of a cubic foot?

13. A rectangular tank, 6 ft. wide, 10 ft. long, and 3 ft. deep, is full of water. What is the weight of the water?

14. 35 cu. ft. of coal weighs about 2000 pounds. How many tons does a wagon box 7 ft. long, 3 ft. wide, and 2 ft. high hold when loaded full?

1. Add, prove, and note the time you take:

3	4	6	9	6	6	8	9	4	5	5	5
3	2	3	1	3	7	6	6	5	4	6	5
3	6	2	3	4	2	1	8	6	6	7	7
2	7	4	2	5	1	4	1	7	2	8	7
5	5	7	6	2	3	2	2	8	3	9	6

2. Add, prove, and note the time you take:

2	1	2	2	4	5	9	7	7	8	9	7
2	2	3	4	3	8	8	6	7	7	8	3
2	3	4	6	1	2	3	2	5	6	7	8
3	4	5	3	2	3	2	3	4	5	6	2
7	5	2	8	8	6	1	5	3	4	5	6

3. Subtract, and note the time you take:

268	321	463	866	711	301	400	600	700
129	148	375	688	327	199	298	378	509

4. Multiply, prove, and note the time you take:

28	68	75	68	47	43	59	68	75	86
32	42	37	18	26	47	28	55	56	38

5. Divide, and note time taken:

$4\overline{)176}$	$6\overline{)738}$	$6\overline{)1386}$	$8\overline{)1880}$	$9\overline{)3249}$
$21\overline{)4242}$	$23\overline{)2553}$	$30\overline{)1620}$	$40\overline{)2400}$	$50\overline{)2700}$

6. Prove the results of problem 3, by adding the *difference* to the subtrahend in each case and comparing the sum with the minuend. Note time.

7. Prove the results of 5 by multiplying quotient by divisor and comparing the product with the dividend.

TABLE OF LIQUID MEASURE

4	gi. (gills)	= 1 pt. (pint).
2	pt. (pints)	= 1 qt, (quart).
4	qt. (quarts)	= 1 gal. (gallon).
31½	gal. (gallons)	= 1 bbl. (barrel).
231	cu. in.	= 1 gal.

1. Add:

4 gal. 2 qt. 1 pt.	7 gal. 3 qt.	2 bbl. 14 gal. 1 qt.
3 1 1	2 2 pt.	3 6 3
1 bbl. 20 gal. 1 qt.	15 gal. 1 pt.	16 gal. 1 qt.
11 1	2 3 qt.	1 bbl. 15 1

2. Subtract:

7 gal. 3 qt. 2 pt.	3 bbl. 30 gal. 2 qt.	1 bbl. 31 gal. 2 qt.
3 2 1	1 21	8 1

3. Multiply:

2 gal. 3 qt. 1 pt.	7 gal. 1 qt. 2 pt.	2 bbl. 10 gal. 2 qt.
2	4	3

4. A milkman starts with 42 gal. of milk. He sells $\frac{2}{3}$ of it to private customers and the rest to a hotel. How many quarts does he sell to the hotel?

5. A druggist put 1 qt. of liquid into bottles holding $\frac{1}{2}$ gi. each. How many bottles did he use?

6. How many jelly glasses holding $\frac{2}{3}$ of a pt. each can be filled from 1 gal. of jelly?

7. How many cubic inches are there in 32 liquid quarts? How many more cubic inches are there in 32 dry quarts (1 dry qt. = $\frac{1}{32}$ bu.) than there are in 32 liquid quarts?

1. How many pint bottles will hold 2 gal. 1 pt. of vinegar? What is it worth at 13¢ a quart?

2. If a gallon of olive oil cost $4, what will 5 pt. cost?

3. From a milk can holding 8 gal., $\frac{3}{16}$ of the milk was spilled. How many quarts were left? How many gallons?

4. How much ice cream will a man make if he uses a gallon and a half freezer and makes it full twice, and half full the third time?

5. How many gal. in 412 gills?

6. What part of 12 gal. is $4\frac{1}{2}$ gallons?

7. A man sold 12 cans of mineral water, each holding 6 gal. at 15¢ per gal. How much did he receive?

8. How many oil barrels, each holding 45 gal., can be filled from a tank holding 10,800 gal. of oil?

9. A hotel uses 25 gal. 3 pt. of milk each day. How much does it use in 3 weeks?

10. There are 231 cu. in. in 1 gal. How many cu. in. in a bottle holding 2 quarts?

11. How many cubic inches in a cistern holding 10 bbl.? 12 bbl.? 16 barrels?

12. From a barrel of vinegar a grocer fills 2 four-gallon jugs and puts 3 gal. and 1 qt. in another jug. How many gal. had he left in the barrel?

13. A man sells 3 gal. and 2 qt. of molasses to one customer, 2 gal. and 1 qt. to another customer, and 1 qt. and 1 pt. to a third. How many quarts did he sell in all? How many gallons?

14. From a barrel full of rain water, 80 qt. were taken out at different times. The water remaining in the barrel measured 40 qt., the rest having evaporated. How much water evaporated?

1. A brick mason agrees to build a chimney for \$72. It takes 10 days to do the work and he pays each of his 2 helpers \$1.50 a day. What is his own pay per day?

2. A man agreed to haul away 1560 cu. yd. of clay for \$264. He paid 4 teamsters \$3.90 each per day for 13 days. How much did he have left?

3. At the rate of 13¢ per cu. yd., how many yards did each teamster haul to earn what he received?

4. A man hauls sand for 9¢ per cu. yd. If his wagon holds $1\frac{1}{2}$ cu. yd. and he hauls 18 loads per day, what is his daily pay?

5. A newsboy buys his papers at the rate of 10 for 6¢ and sells them for 1¢ each. How much will he gain if he sells 75 papers? 120 papers?

6. He sells 45 on Monday, 54 on Tuesday, 81 on Wednesday, and 70 on Thursday. What does he gain in the 4 days?

7. On Friday he buys 100 papers and sells all but 5 that are spoiled by the rain. What does he receive for his work on Friday?

8. A newspaper prints $1\frac{1}{2}$ million copies in 6 days. At the end of the week 13,526 copies had been given away and 29,674 copies were left on hand. What was the average daily paid circulation?

9. If $\frac{1}{2}$ of these papers are sold by newsboys, how many newsboys must there be, if each one sells 100 papers every day?

10. A man divides 80 acres of land into streets and building lots. The streets take up $\frac{1}{16}$ of the land, and the remainder is divided into blocks each containing 3 A. How many blocks are there?

TABLE OF DRY MEASURE

2 pt. (pints) = 1 qt. (quart).
8 qt. (quarts) = 1 pk. (peck).
4 pk. (pecks) = 1 bu. (bushel).

1. Add:

1 pk. 6 qt.	1 bu. 2 pk. 3 qt.	2 bu. 3 pk. 4 qt.
2 1	2 1 5	3 4
2 pk. 5 qt.	5 bu. 2 qt.	3 bu. 3 pk. 7 qt.
2	3 pk. 6	1

2. Subtract:

3 pk. 6 qt.	3 bu. 2 pk. 7 qt.	6 bu. 1 pk. 5 qt.
2 4	2 5	1 1 1
2 pk. 4 qt.	8 bu. 3 pk. 5 qt.	12 bu. 2 pk. 6 qt.
1 4	2 2 2	7 4

3. Multiply:

2 pk. 3 qt.	3 bu. 1 pk., 3 qt.	4 bu., 1 pk. 1 qt.
2	3	4

4. How many bushels in 128 pk.? In 150 pecks?

5. How many quart boxes will 1 bu. 3 pk. 2 qt. fill?

6. Find cost of 3 pk., 6 qt., 1 pt. of nuts, at 12½¢ a pint.

7. In 96 qt. how many pecks? How many bushels?

8. What part of 7 bu. is 7 pk.? 7 quarts?

9. How many quarts of cherries can be bought for $2, if 1 bushel of cherries is worth $3.20?

10. A teamster feeds his horses 36 qt. of oats a day. How long will 120 bu. of oats last him? What does it cost him a day when oats are worth 27¢ a bushel?

1. From a sack holding 3 bu. of peanuts, 25 qt. were taken. How many bushels remained?

2. A bushel and a half of plums was divided equally among 12 people. How many quarts did each receive?

3. How many pecks of beans does a man sell, if he sells 3 qt. to each of 8 customers?

4. A woman measuring out $2\frac{1}{2}$ qt. of flour uses a pint measure. How many times does she fill the measure?

5. A barrel of apples was sold in 3 lots. The first sale was 1 bu. and 2 pk.; the second 2 pk.; the third $1\frac{1}{2}$ bu. How many bushels were there in the barrel?

6. From 3 bushels of peas, a man sells $\frac{1}{2}$ peck to one customer, 4 qt. to another, 1 pk. to another. How much has he left?

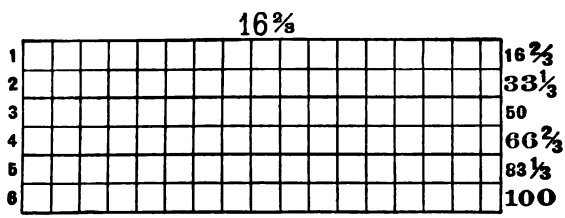
7. If $\frac{1}{2}$ peck of peaches when canned make 3 qt., how many bu. must be bought to make 36 qt. when canned?

8. A man bought at a feed store 5 bu. of corn, 2 bu. and 3 pk. of oats, and $1\frac{1}{2}$ bu. of mixed feed. He had at home 3 pk. of corn, $\frac{1}{2}$ bu. of oats and 1 pk. of ground feed. How many bushels of feed did he have after receiving what he bought?

9. A farmer used for food $50\frac{1}{4}$ bu. of potatoes. He saved 9 bu. 3 pk. for planting and sold $117\frac{1}{2}$ bushels. How many bushels did he raise that year?

10. 240 boxes of peaches, holding 1 pk. each, were shipped to market. The fruit was picked in one-half bushel baskets. How many baskets of fruit were there?

11. A fruit dealer bought 2 crates of berries, each holding 24 qt., and 6 crates, each holding 32 qt. He put the berries into pint boxes and sold them at 10¢ a box. How much money did he receive?



1. Add:

$16\frac{2}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$	$33\frac{1}{3}$	$66\frac{2}{3}$	$83\frac{1}{3}$
$16\frac{2}{3}$	$33\frac{1}{3}$	50	$33\frac{1}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$

2. $16\frac{2}{3} \times 3 = ?$ $16\frac{2}{3} \times 6 = ?$

$16\frac{2}{3} \times 2 = ?$ $16\frac{2}{3} \times 5 = ?$

$16\frac{2}{3} \times 4 = ?$ $16\frac{2}{3} \times 9 = ?$

3. $16\frac{2}{3}$ is what part of 50? $66\frac{2}{3}$? $33\frac{1}{3}$? $83\frac{1}{3}$?

4. $33\frac{1}{3}$ is what part of 50? $66\frac{2}{3}$? $83\frac{1}{3}$? 100?

5. 50 is how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s?

6. $66\frac{2}{3}$ are how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? 50's?

7. $83\frac{1}{3}$ are how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? 50's? $66\frac{2}{3}$'s?

8. 100 is how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? 50's? $66\frac{2}{3}$'s? $83\frac{1}{3}$'s?

9. A man paid $\frac{1}{6}$ of a dollar each for 15 books. How much did they cost him?

10. A boy $33\frac{1}{3}$ miles from home, rode $\frac{1}{2}$ the distance on his wheel. How many miles did he ride?

11. A piece of cloth 3 yd. long sold for 50¢. What was the price per yard?

12. A girl picked 100 qt. of berries in 6 days. What was the average amount per day?

13. A hundredweight of grain was divided into 3 equal amounts? How many pounds in each?

14. From a tank of water, $16\frac{2}{3}$ gal. were drawn out, which was $\frac{1}{6}$ of the amount remaining. How many gallons were left in the tank?

1. A schooner brought 48,972 spruce trees from northern Michigan to Chicago at Christmas time. How much were they worth at 90¢ a dozen?

2. A blacksmith shoes 42 horses at $2 each in 1 week. The shoes and nails cost him $8, shop rent $12, and he pays each of his two helpers $15 per week. What was his share of the money received?

3. A teamster has his two horses shod all around, twice each month, during Dec., Jan., and Feb., and once a month during the remainder of the year. How much does it cost him a year at $2 per shoeing for each horse?

4. A cooper made 1000 butter tubs at 12¢ each. If he paid $\frac{1}{6}$ of the price for lumber and $\frac{1}{2}$ of it to his workmen, how much did he have left?

5. Each tub holds 24 pounds. What is 1000 tubs of butter worth at 21¢ a pound?

6. There are 630 sq. yd. of lathing needed in a new house and it can be done in 6 days. Will a man earn more by doing it by the day at $3 per day or by the square yard at 3¢ per square yard?

7. If 54 laths cover 4 sq. yd., how many will be needed for 600 sq. yd.? How many bundles of 50 laths each?

8. Each lath requires 6 nails, and 54 laths cover 4 sq. yd., how many nails will 600 sq. yd. use? How many pounds, allowing 400 nails to the pound?

9. A carpenter works $5\frac{1}{2}$ days in a week at $3 per day, but breaks a saw worth $1.40 and loses a hammer worth 90¢. What is the week's work worth to him?

10. A painter has 3 helpers at $3.50 each per day and 2 helpers at $3 each. What must he charge for a week's work to have $25 for himself?

For convenience in reading, numbers are separated by commas into groups of 3 figures, beginning at ones. The 3-figure groups are called *periods*, thus:

Thousands				Units		
Hundreds.	Tens.	Ones.		Hundreds.	Tens.	Ones.
		6	,	1	2	3
	4	9	,	8	5	2
7	9	5	,	6	4	8

In reading these numbers the figures of each period are read as though they stood alone and then the name of the period is added, thus:

6 thousand 123;
49 thousand 852;
795 thousand 648.

1. Read the following numbers:

8,000	64,387	910,643
7,004	30,300	606,606
4,345	82,082	450,450
5,060	47,740	745,547
3,400	53,961	300,300

2. The number 2,461,375 shows the beginning of a new period, called *millions*. This number is read:

2 million 461 thousand 375.

Read the following numbers:

7,000,000	5,406,406
82,000,000	47,340,340
436,000,000	202,202,202

The method, just described, of representing numbers by figures is called the Arabic notation.

There is another method of writing numbers, in which *letters* are used. It is called the Roman notation.

1. Write the Arabic figure for each of the following:

I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XX.

L = 50, C = 100, D = 500 and M = 1000.

If a letter is followed by one or more letters of equal or less value, the *sum* of all is the value of the number represented. Thus: VI = 6; XI = 11; XX = 20; CLX = 160; DC = 600.

If a letter is followed by another of greater value, the *difference* of the two is the value of the number represented. Thus: IV = 4; IX = 9; XIX = 19; XL = 40; CD = 400.

2. Give the value in the Arabic notation of the following numbers:

XIV	DIX	XIV	XXVII	CCCXVI
XIX	LCI	XCXI	XXXIX	MCLXIX
LIV	XLIV	LXIX	CLXXI	MCLVI
CXI	XLIX	XXXIV	LXXVI	MCMVIII

Write the following numbers in the Roman notation: 9, 4, 6, 14, 29, 13, 78, 44, 83, 59, 94, 96, 104, 199, 335, 549, 2000, 1908.

Write answers to the following in Roman numerals:

3. Columbus discovered America in MCDXCII. 20 years later Florida was explored. In what year was Florida explored?

4. The first battle of the Revolution was fought in MDCCLXXV. The last battle was fought 6 years later. What was the year of the last battle?

5. Washington was elected President in MDCCLXXXIX. Roosevelt was elected 115 years afterward. In what year was Roosevelt elected?

1. Add:

(1)	(2)	(3)	(4)	(5)	(6)
7843	32765	25987	96875	81818	247
8789	89247	6586	40984	92193	91838
9576	76348	78379	50839	87689	9705
2589	20873	96468	9787	76434	87278
8956	94608	980	67898	68979	3849
3210	13495	20876	76580	37590	89878
7029	68950	67099	54777	89763	79929
47992					
334					

In long columns the number to be carried may be indicated by writing it underneath the column as in problem (1).

To prove the work, add from the top, downward.

2. Add the following problems in the usual way:

(1)	(2)	(3)	(4)
68	238	237	24567
97	472	48984	89012
89	836	3789	4567
43....297	980.....?	54976.....?	89876.....?
30	722	500	54378
78	146	3897	98989
83	348	57878	24864
29....220	765.....?	36498.....?	3099.....?
48	897	9889	87655
67	305	65847	98788
98	969	678	4890
88....301	878.....?	88769.....?	86767.....?
818 818			

Another method of proof is to think the columns divided into parts, add the parts, then add these partial sums.

1. 6384 *The Minuend is the number subtracted from.*

1945 *The Subtrahend is the number subtracted.*

4439 *The Difference, or Remainder is the result.*

6384 The sum of the difference and subtrahend should be the minuend. If so, the work is correct.

2. Subtract the following and prove by adding:

(1)	(2)	(3)	(4)	(5)	(6)
8346	24890	36745	48234	57855	72180
5838	17901	17829	29018	29666	23092

(7)	(8)	(9)	(10)	(11)	(12)
62387	83475	90281	38297	27666	87726
34299	56077	37345	19088	18785	68640

(13)	(14)	(15)	(16)	(17)	(18)
418967	687240	723485	868240	927200	707241
229875	478119	438907	372906	418117	354438

(19)	(20)	(21)	(22)	(23)	(24)
381487	592173	600840	821380	727248	917288
191598	394205	236450	291653	570649	129399

3. A man began business with $5275.75; in five years he had $22,794.50. How much had he gained?

4. One road is 20 mi. 160 rd. long; another is 14 mi. 80 rd. long; how much longer is the first than the second?

5. A cotton dealer bought 328,900 lb. of cotton one year, and 715,600 lb. the next. How many pounds more did he buy the second year than the first?

6. One vessel is valued at $1,250,000; another at $975,800. What is the difference in value?

1. Multiply 892 Which number is the multiplicand?
by 235 The multiplier? The product?

To how many times 892 is the sum of 5 times 892 + 30 times 892 + 200 times 892 equal?

FULL FORM		CONVENIENT FORM
Multiply 892		892
by 235		235
4460	= 5 × 892	4460
26760	= 30 × 892	2676
178400	= 200 × 892	1784
209620	= 235 × 892	209620

2. Multiply the following:

(1)	(2)	(3)	(4)	(5)	(6)	(7)
563	589	789	582	678	765	899
365	589	579	376	497	689	655

3. Multiply (1) 729 by 460; (2) 476 by 308.

(1)	(2)
729	476
460	308
43740	3808
2916	1428

4. Compare 4×5 with 5×4. Compare 892×235 with 235×892. In multiplication why do we commonly use the smaller number for the multiplier? Give a way of proving that a product is correct.

5. A steamer burns 378 lb. of coal in going 1 knot. How many pounds will it burn in going 15,288 knots?

6. A man's daily income is \$3.65. How much is his yearly income?

1. Find the products of the following, and prove results:

573 × 248	384 × 537	735 × 376	487 × 789
858 × 305	275 × 937	972 × 219	976 × 253
835 × 583	508 × 607	506 × 429	4005 × 129
968 × 675	651 × 234	309 × 150	2060 × 456
809 × 584	943 × 923	847 × 907	3070 × 250
548 × 394	475 × 406	653 × 295	1022 × 284

2. An elevator in a tall building goes up 165 ft. and down the same distance each trip. How many feet does it go in 152 trips?

3. It costs 56¢ a word for a cablegram from Japan to Chicago. How much will a message of 1213 words cost?

4. There are 40 street lamps on 1 mile of street, each burning 18 cu. ft. of gas every night. How much gas will they burn in the month of April?

5. A library has in one case 276 books, which contain, on an average, 304 pages each. How many pages of reading matter in the bookcase?

6. There are 897 hills of corn in a single row and 364 such rows in a field. How many hills of corn in the entire field?

7. How many square feet in an acre? If 189 pounds of water fall on one square foot in a year, how many pounds will fall on an acre in a year?

8. There are 12 elevators in a building. Each makes 94 round trips in a day and carries, on an average, 4 passengers each way. How many passengers make single trips on all of them in a day?

9. In a single layer in a wall there are 964 bricks. The wall is 197 bricks high. How many bricks does it contain?

1. Divide 21,816 by 72.

$$72\overline{)21816}\quad 303$$

216

216

216

What does 303×72 equal? How, then, may the correctness of the work of division be proved?

$21{,}816 \div 72 = 303.$

2. Divide 15,250 by 61.

$$61\overline{)15250}\quad 250$$

122

305

305

3. Divide 5130 by 342.

$$342\overline{)5130}\quad 15$$

342

1710

1710

4. Divide 25,215 by 105.

$$105\overline{)25215}\quad 240\tfrac{15}{105}$$

210

421

420

15 remainder.

Proof: 105 divisor.
240 quotient.
4200
210
25200
15 remainder.
25,215 dividend.

To test the correctness of division, multiply the divisor by the quotient, and add the remainder if there is one. The result should equal the dividend.

5. Divide and test:

$3767 \div 38$	$99{,}684 \div 234$
$7873 \div 41$	$91{,}464 \div 111$
$7692 \div 32$	$94{,}770 \div 135$
$67{,}654 \div 53$	$95{,}928 \div 806$
$26{,}754 \div 64$	$90{,}750 \div 125$
$95{,}637 \div 75$	$68{,}331 \div 911$

1. There were 23 cars in a train and 21 cattle in each car. The entire weight of the cattle was 645,502. What was the average weight per head?

2. An apartment building containing 48 apartments cost $132,240. What was the average cost of an apartment?

3. A farmer paid $20,000 for 324 acres of land. How much did it cost him per acre?

4. Solve the following exercises:

$516\overline{)220332}$	$718\overline{)92622}$	$356\overline{)182984}$	$729\overline{)91125}$
$618\overline{)400276}$	$317\overline{)687020}$	$540\overline{)72689}$	$720\overline{)840671}$
$427\overline{)600000}$	$825\overline{)872640}$	$207\overline{)907060}$	$421\overline{)117000}$
$5027\overline{)702060}$	$1702\overline{)347020}$	$1202\overline{)987261}$	$4800\overline{)960000}$
$5200\overline{)987654}$	$3702\overline{)587869}$	$1234\overline{)765432}$	$1067\overline{)987000}$

5. On a certain trip the traveling expenses for one person to London and return were $325. How many such trips would $9100 furnish?

6. A proofreader counted the number of words in a book, finding 88,440 words on 268 pages. How many words were there on an average page?

7. A wealthy man gave to the 4 fire departments of a village (each department employing 27 men) $32,400 as a donation, to be divided equally among the firemen. How much did each man receive?

8. A woman donated $1701 to buy books for the school children of a certain town. There were 567 school children. How much was the average donation per pupil?

1. A lumber vessel carried 887,392 barrel staves. Allowing 16 staves to the barrel, how many barrels can be made from them?

2. A ship traveled about 15,228 nautical miles in 66 days, stopping 12 days on the way for coal and other supplies. Find the average speed per hour.

3. The Danube river is 1725 miles long; the Rhine 600, and the Rhone 580. How many times as long as the Thames, which is 220 miles long, is their united length?

4. There are 102 counties in Illinois and the area of the state is 56,650 square miles. What is the average size of a county?

5. Chicago's area is 119,689 acres. How many square miles of land in Chicago?

6. A field of corn has 229,559 hills. There are 291 equal rows. How many hills in each row?

7. A rectangular farm contains 552,866 square yards. One end is 563 yd. long. How long is one side?

8. A rectangular field contains 926,156 square feet. One end is 679 feet long. How long is one side?

9. At a brick yard 3,276,224 bricks were made during the season. They were hauled away in 824 equal loads. How many bricks were hauled at a load?

10. $48,077.29 was divided equally among 709 men. How much did each man receive?

11. A merchant sold 999 bicycles for $41,793.72. What was the average selling price of a bicycle?

12. In four years a factory uses 1,434,160 pounds of coal. What was the average amount used per week?

13. The Atlantic Ocean, in the deepest part, is 27,366 feet deep. What is the depth in miles?

1. Add, and note time taken:

7	8	9	9	28	44	25	75	4	6
1	2	8	9	31	16	64	1	17	604
6	4	7	7	46	21	71	325	6	28
3	5	6	2	58	17	29	26	297	9
7	1	5	4	30	64	86	2	8	190

2. Subtract, and note time taken:

8402	7008	8002	6006	7010	20104	30607
1384	3261	1247	2987	3265	8638	29838

3. Multiply and note time taken:

124	216	328	560	762	408	902	988
32	36	43	44	48	57	86	97
328	482	614	736	808	588	961	998
216	315	402	207	304	608	808	786

4. Divide, and note time taken:

$12\overline{)232}$	$21\overline{)294}$	$18\overline{)576}$	$27\overline{)351}$
$33\overline{)1254}$	$13\overline{)806}$	$24\overline{)1008}$	$43\overline{)1806}$

5. Divide, and note time taken:

$36\overline{)4428}$	$42\overline{)13692}$	$54\overline{)22734}$	$68\overline{)30736}$
$86\overline{)77572}$	$97\overline{)95836}$	$138\overline{)45264}$	$216\overline{)70848}$

6. Add, and note time taken:

4308	8063	89	7	70006
209	214	1097	1838	6318
98	9098	7809	2785	87292
1097	935	364	8190	2364
672	1710	2079	706	555

TABLE OF WEIGHT

16 oz. (ounces) = 1 lb. (pound).
100 lb. (pounds) = 1 cwt. (hundredweight).
20 cwt. or 2000 lb. = 1 T. (ton).

1. How many ounces in 8 lb.? In 14 lb.? In 20 lb.?
2. How many lb. in $3\frac{1}{2}$ cwt.? In $7\frac{1}{5}$ cwt.? In $9\frac{1}{4}$ cwt.?
3. How many lb. in 1 T.? In 4 T.? In $3\frac{1}{4}$ T.?
4. How many oz. in $\frac{1}{2}$ cwt.? In $2\frac{1}{4}$ cwt.? In $3\frac{2}{5}$ cwt.?
5. How many oz. in $\frac{1}{2}$ T.? In $3\frac{1}{5}$ T.? In $2\frac{1}{8}$ T.?
6. How many cwt. in $\frac{1}{2}$ T. and in $\frac{1}{4}$ T. together?
7. Add:

2 T. 17 cwt. 25 lb.	1 T. 8 cwt. 60 lb.
1 2 75	4 1 40
10 cwt. 25 lb. 8 oz.	9 cwt. 20 lb. 4 oz.
5 30 6	4 9 9
4 44 2	6 18 2

8. Subtract:

2 T. 15 cwt. 14 lb.	2 T. 12 cwt. 9 lb.
2 7 8	1 8 6
15 cwt. 75 lb. 8 oz.	16 cwt. 43 lb. 12 oz.
8 35 5	14 23 8

9. Multiply:

3 T. 5 cwt. 15 lb.	2 T. 3 cwt. 20 lb.
4	5
2 cwt. 9 lb. 2 oz.	4 cwt. 3 lb. 4 oz.
8	4

10. Divide:

$2\overline{)}$4 T. 18 cwt. 50 lb.	$3\overline{)}$6 T. 15 cwt. 48 lb.

1. At 10¢ an oz. how much will $3\frac{1}{2}$ lb. of cinnamon cost? $4\frac{1}{4}$ pounds?

2. What will a ton of hay cost at $\frac{3}{4}$¢ a pound?

3. A bushel of wheat weighs 60 pounds. How many bushels are there in a load of wheat weighing 1 T. 6 cwt. and 40 pounds?

4. A family uses 75 lb. of ice every day for 20 days. What does it cost them at 35¢ per hundredweight?

5. From 10 cwt. of sugar a grocer sold 8 cwt., 40 lb., 12 ounces. How much was left?

6. What was the cost of 3 lb., 8 oz. of meat at 16¢ a lb. and 2 lb., 12 oz. of butter at 20¢ a pound?

7. A bushel of oats weighs 32 pounds. How many bushels in 80 hundredweight?

8. From a keg of nails weighing 1 cwt., at one time, 15 lb. and 8 oz. were taken; at another, 9 lb. and 12 oz. What was the weight of the nails remaining?

9. How many bales of cotton, each weighing 450 lb. may be shipped on a vessel which can carry 2250 tons? On a vessel that can carry 3600 tons?

10. What will it cost to have 7 tons of coal hauled at 75¢ a load of 3500 pounds?

11. 500 bbl. of flour are shipped in 20 equal loads. How many tons in each load? (1 bbl. weighs 196 pounds.)

12. A man hauled 8 loads of wheat, 35 bu. at a load. A bushel of wheat weighs 60 pounds. What was the weight of the 8 loads? How many hundredweight in each load?

13. A farmer owning 700 bu. of oats sold 9 loads of 2240 pounds each. One bushel weighs 32 pounds. How many bushels had he left?

TABLE OF TIME

60 sec. (seconds) = 1 min. (minute).
60 min. (minutes) = 1 hr. (hour).
24 hr. (hours) = 1 da. (day).
7 da. (days = 1 wk. (week).
365 da. / 52 wk. 1 da. / 12 mo. } = 1 yr. (year).

1. How many months in a $\frac{1}{2}$ yr.? In $3\frac{1}{4}$ yr.? In $5\frac{1}{6}$ yr.?

2. How many minutes in 3 hr.? In $2\frac{1}{3}$ hr.? In $1\frac{1}{4}$ hr.? In $\frac{3}{4}$ hr.? In one day?

3. In 4 yr. how many days? In $2\frac{1}{5}$ yr.? In $\frac{4}{5}$ yr.?

4. How many seconds in 5 min.? In one hr.? In $\frac{1}{2}$ hr.? In $\frac{1}{2}$ day?

5. Add:

8 hr.	30 min.	15 sec.
3	29	45

3 mo.	4 wk.	7 da.
8	3	12

1 yr.	8 mo.	15 da.
3	2	5

2 yr.	6 mo.	10 da.
2	4	15

6. Subtract:

24 hr.	50 min.	30 sec.
8	30	15

4 yr.	8 mo.	15 da.
1	2	6

6 yr.	4 mo.	20 da.
3	3	12

5 yr.	9 mo.	6 da.
4	8	5

7. Multiply:

4 hr.	15 min.	30 sec.
		2

3 hr.	15 min.	20 sec.
		3

4 yr.	2 mo.	4 da.
		5

5 yr.	2 mo.	3 da.
		6

1. Divide:

2)6 hr. 45 min. 15 sec. 6)24 hr. 30 min. 18 sec.

2)4 yr. 8 mo. 12 da. 5)5 yr. 10 mo. 15 da.

2. Find the time from June 6, 1885, to Aug. 12, 1889. Use the numbers that indicate the order of the months in the year instead of the names. Call Jan., 1; Feb., 2, etc.

Aug. 12, 1889 = 1889 yr. 8 mo. 12 da.

June 6, 1885 = 1885 6 6

4 2 6

3. Find the time from:

Jan. 2, 1865, to June 5, 1887;

Mar. 12, 1885, to May 21, 1889;

July 21, 1872, to Sept. 26, 1890;

Feb. 15, 1860, to Oct. 29, 1901;

Nov. 2, 1889, to Dec. 28, 1904;

Apr. 10, 1879, to Aug. 25, 1908.

4. A boy works $\frac{1}{3}$ of each day (24-hr.) for 6 days at 20¢ an hr. What is his week's salary? He works 10 hr. overtime; half of that time at 15¢ a half hour and the rest at 20¢ a half hour. What is his pay for the extra work?

5. A man leaves his office for home at 5:45 P.M., and arrives 45 min. later. What time does he reach home?

6. A fast mail train runs from Chicago to Burlington in 5 hr. 20 min. 45 sec. A freight train runs the same distance in 9 hr. 40 minutes. How much longer does it take the freight train?

7. James was born September 18, 1887, and Willie was born December 21, 1892. How much older is James?

1. There are 18 windows in each side of a car. How many windows are there in the sides of 397 cars?

2. There are 319 pages in a book. How many pages are there in 369 such books?

3. In a 7-story building, there are on each of the sides, 27 windows on each story; there are on each of the ends 16 windows on each story. How many windows in all?

4. A street paved with stone blocks contains 65 stones in width and 786 in length. One man must buy half of the stones. If they cost him 7¢ each, how much does he pay for them?

5. How many grains will 1648 silver dollars weigh, if one dollar weighs 412½ grains?

6. A man rides his bicycle 116 miles a day. How far from the city can he go and return in 12 days?

7. It is 195 feet between telegraph poles. How much wire is needed to put up 6 wires on 257 poles?

8. A merchant bought 97 rolls of carpet, 27 of them containing 56 yards to the roll; 34 containing 59 yards to the roll, and the remainder 63 yards to the roll. How many yards did he buy?

9. A manufacturer sold 65 cases of shoes at $2.75 a pair, each case containing 6 dozen pairs. What was the value of his sale?

10. A farmer had 2365 bushels of wheat. He sold 1240 bushels at 65¢ a bushel; 643 bushels at 85¢ a bushel, and the remainder at 96¢ a bushel. How much did he get for the entire crop of wheat?

11. A merchant's sales were $127 a day for 23 days, $156 a day for 19 days, and $113 a day for 32 days. How much was the total amount of his sales?

1. New York is 91 miles from Philadelphia. A man made 26 round trips from New York to Philadelphia. How many miles did he travel?

2. A man lived 27 miles from Washington. He came into the city and returned 6 days a week for 14 weeks. How many miles did he travel?

3. A manufacturer sold 687 bicycles at $47 apiece. How much did he get for them?

4. An agent sold 163 reapers at $145 each. What was the amount of his sale?

5. A square building is 115 ft. high and 122 ft. wide. What is the area of one of the sides in square feet?

6. The same building is covered with a flat roof. How many square feet in the roof?

7. 53 cars stand in a solid blockade on the street. 26 of them are 32 ft. long and the others are 37 ft. long. How long is the blockade?

8. A street car company sold 540 horses at $62.25 a head. For how much did the horses sell?

9. A man works $8\frac{1}{2}$ hours a day, 6 days in the week, for 26 weeks. How many minutes does he work?

10. For every 25 papers a boy delivered, he received 13¢. If he delivered 175 papers each work day for 2 weeks, how much money did he receive?

11. I burned a quart of oil a week. The oil cost me 13¢ a gallon. How much did the oil cost me for a school year of 40 weeks?

12. An elevator boy received $13 a month as wages. At the end of the year he had spent $19 for clothing, $32 for car fare, $4.50 for books and had given his mother $48. How much money had he left?

A man had one five-dollar bill, two two-dollar bills, three one-dollar bills, two half-dollars, three quarters, four dimes, six nickels, and three pennies. How can he make even change for any one of the following purchases:

1. A bicycle tire at $2.75?
2. A hat at $2.65 and a necktie at 50¢?
3. A vest at $3.50 and a dozen collars at 95¢?
4. One book at $1.25 and another at 38¢?
5. A box of paper at 50¢, an inkstand at 65¢, and a fountain pen at $1.95?
6. A pair of shoes at $2.95?
7. Railroad fare at $4.42?
8. Hotel bill for $2\frac{1}{2}$ days at $2.50 a day?
9. A magazine, 35¢, a newspaper, 2¢, and a sheet of paper, envelope, and stamp, 5¢?
10. A bicycle suit at $6.70? Repairing bicycle, $4.70?

A boy got at the bank, at different times, the amounts of change indicated below. Find how many of each piece of money might be given him. Give two or three answers for each problem.

11. A twenty-dollar bill changed to get five-dollar bills, one-dollar bills, and half-dollars?
12. A ten-dollar bill, changed to get two-dollar bills, one-dollar bills, half-dollars, and quarters?
13. A five-dollar bill, changed to get dollars, half-dollars, quarters, and dimes?
14. A two-dollar bill, changed to get half-dollars and dimes?
15. A one-dollar bill, changed to get quarters, dimes, nickels, and pennies?
16. A half-dollar, to get dimes, nickels, and pennies?

24 sheets = one quire. 20 quires = one ream.

1. How many sheets in $\frac{1}{2}$ quire? In $\frac{3}{4}$ quire?

2. How many sheets in $\frac{1}{3}$ ream? In 2 reams?

3. How many quires in 72 sheets? In 96 sheets?

4. What is the cost of a ream of paper, at 3 sheets for 1¢? At 5 sheets for 1¢?

5. A man bought one box of paper containing 2 quires and another containing 5 quires. How many sheets of paper did he buy?

6. If 12 sheets of paper cost 5¢, what is the cost of a ream at the same rate?

7. I paid $1.20 for a ream of paper. What was the cost of $\frac{1}{2}$ quire?

8. How many boxes will hold a ream of paper if each box contains $1\frac{1}{3}$ quires? $1\frac{1}{4}$ quires?

9. A man bought paper at $1.50 a ream and sold it at 12 sheets for 5¢. How much did he gain?

10. A man bought paper at $2.75 a ream and sold it at 20¢ a quire. What was his gain? If he had paid $3 a ream and sold it at 25¢ a quire, how much more would he have gained?

11. A ream of paper is divided into 40 equal portions. What part of a quire is each portion?

12. From 3 reams of paper $1\frac{1}{4}$ reams were sold at one time and 3 quires at another time. How many sheets were left? How many quires? What part of a ream?

13. After collecting damaged lots of paper, a man had 18 quires and 14 sheets of one kind; 11 quires and 5 sheets of another kind, and 10 quires and 5 sheets of a third kind. He sold it at $1.25 a ream. How much did he get for all?

1. A man leaves his home each work day at 8:11 A.M. and reaches his office at 8:27. He returns in the evening, leaving his office at 5:45 and reaching his home at 6:01. How many hours does he spend on the way in a week? In the month of January, if it has 4 Sundays?

2. A teacher leaves her home every school-day at 8:20 A.M., and reaches the schoolhouse at 8:44. She returns, leaving the schoolhouse at 3:43 P.M., and reaching her home at 4:08. How many hours does she spend on the way in 4 weeks? How many hours in the school year of 38 weeks?

3. How far does she travel in 4 weeks, if the schoolhouse is $\frac{7}{8}$ of a mile from her home? How far does she travel in a school year of 40 weeks?

4. A train leaves New York at 7:55 A.M., and reaches Washington at 1:33 P.M. It stops 11 minutes at stations on the way. What is the actual running time from New York to Washington?

5. A train leaves Chicago at 9:00 P.M., and arrives in St. Louis at 7:28 the next morning. Another train leaves Chicago at 11:30 P.M., reaching St. Louis at 8:04 next morning. In how much less time does one train run than the other, and which is the faster train?

6. A train leaves Pittsburg at 1:10 P.M., and reaches Buffalo at 8:15 the same evening. If 23 minutes are spent in stopping at stations, what is the actual running time from Pittsburg to Buffalo?

7. A second train leaves Pittsburg at 11:00 P.M., and reaches Buffalo at 7:09 next morning. How much longer is this train on the way than the one which left Pittsburg at 1:10 P.M.?

1. A lot cost $200. The house cost $12\frac{1}{2}$ times as much as the lot, and the fence $\frac{1}{2}$ as much as the lot. What did the house and the fence together cost?

2. The battle of Lexington was fought April 19, 1775. How many Aprils have there been from then to the present day?

3. The buildings for the Columbian Exposition were dedicated October 21, 1892. How many years, months, and days since the buildings were dedicated?

4. Nathaniel Hawthorne was born July 4, 1809. Texas was admitted to the Union Dec. 29, 1845. How old was Hawthorne when Texas became a state?

5. Daniel Webster was born January 18, 1782, and James A. Garfield was born November 19, 1831. How old was Webster when Garfield was born?

6. California was admitted as a state Sept. 9, 1850, and Oklahoma, Nov. 16, 1907. How long had California been a state when Oklahoma was admitted?

7. Massachusetts was made a state Feb. 7, 1788. How long had Massachusetts been a state when Oklahoma was admitted as a state?

8. How long was it from the Johnstown flood of May 31, 1889, to the Galveston tornado of Sept. 8, 1900?

9. How long was it from the Chicago fire of Oct. 8, 1871, to the Baltimore fire of Feb. 7, 1904?

10. How long was it from the Baltimore fire of Feb. 7, 1904, to the San Francisco earthquake and fire of Apr. 18, 1906?

11. How long was it from the beginning of the Spanish-American war of Apr. 25, 1898, to the beginning of the Russo-Japanese war of Feb. 7, 1904?

1. A grain dealer bought 25,000 bu. of wheat at 97¢ per bushel, and after 3 months, sold it for $1.12 per bushel. He paid storage charges at the rate of ½¢ per bu. a month. What was his gain?

2. A grain elevator holds 800,000 bushels. If it is kept full for 6 months, what will storage charges amount to at ¼¢ per bu. a month?

3. Six vessels carry 800,000 bu. of grain from Chicago to Buffalo. If 1 of them carries 160,000 bu., what is the average load of one of the other five?

4. Wheat weighs 60 lb. to the bushel. What is the weight, in tons, of 160,000 bushels? In hundredweight?

5. An elevator containing 645,000 bu. of grain caught fire and the grain was damaged. The grain was worth 87¢ per bu. and was insured for $250,000. What was the loss not covered by insurance?

6. The owner of the grain, after receiving the insurance money, sold the damaged grain for feed at 13¢ per bushel. What was his actual loss?

7. Corn weighs 56 pounds to the bushel. How many car loads of 20 tons each will fill a vessel that can carry 90,000 bushels?

8. At 10¢ per cwt., what will it cost to ship 90,000 bu. of corn from Chicago to New York City?

9. A vessel owner agrees to carry 125,000 bu. of corn for $3750. How much does he charge per cwt.? Per ton?

10. A builder received $127.25 for making some repairs to a house. He pays each of 2 helpers $2.50 per day for the 12 days needed to do the work. How much money remains for him?

1. Add:

1	rd.	3	yd.	2	ft.	7	rd.	4	yd.	2	ft.
3		4		1		2		3		1	
		2		2		1		2		2	
3	rd.	5	yd.	1	ft.	79	rd.	4	yd.	1	ft.
2		4		2		13		2			
		3				7		5		2	

2. Subtract:

16	rd.	5	yd.	2	ft.	32	rd.	3	yd.	2	ft.
12		3		1		15		4		1	

3. Multiply:

8	rd.	3	yd.	2	ft.	7	rd.	4	yd.	1	ft.
				3						5	

4. Divide:

2)8 rd. 4 yd. 2 ft. 4)18 rd. 4 yd. 2 ft.

5. A room is 16 ft. long and 14 ft. 6 in. wide. How many feet of picture moulding would be needed to go around it? How much would it cost at \$.12½ a foot?

6. One side of a square room is 4 yd., 1 ft., and 6 in. long. How many feet of border would be needed in papering the room?

7. A rectangular field 40 rd. wide is twice as long as it is wide. How many rods of fence would be needed to inclose it? If the fence is 6 wires high, how many feet of wire will it contain?

8. Corn rows in this field are 4 ft. apart, the first row 2 ft. from the long side. How many rows are there? The rows are 79 rd. 3 yd. long. How far would they reach, placed end to end?

1. Add 12 sq. yd., 4 sq. ft., 120 sq. in.; 4 sq. yd., 7 sq. ft., 20 sq. in.; 6 sq. yd., 9 sq. ft., 16 sq. in., and 7 sq. ft., 4 square inches.

2. Add 4 cu. yd., 9 cu. ft., 1200 cu. in.; 3 cu. yd., 400 cu. in.; 4 cu. ft., 600 cu. in.; 5 cu. yd., 12 cubic feet.

3. Add 15 gal., 3 qt., 1 pt.; 4 gal. 2 qt.; 6 qt., 1 pt.; 9 gal., 1 pint.

4. Add 3 bu., 3 pk., 7 qt.; 4 bu., 2 pk., 6 qt.; 3 pk., 4 qt.; 3 bu., 1 pk., 6 qt.; 1 pk., 2 quarts.

5. Add 2 T., 16 cwt., 80 lb.; 1 T., 8 cwt., 15 lb.; 3 T., 10 cwt., 50 lb.; 18 cwt., 90 pounds.

6. Add 4 hr., 45 min., 15 sec.; 6 hr., 30 min.; 55 min., 45 sec.; 3 hr., 30 seconds.

7. Subtract 16 sq. yd., 7 sq. ft., 44 sq. in. from 24 sq. yd., 5 sq. ft., 120 square inches.

8. Subtract 3 cu. yd., 9 cu. ft., 680 cu. in. from 12 cu. yd., 6 cu. ft., 1240 cubic inches.

9. Subtract 1 gal., 3 qt., 1 pt. from 4 gal., 2 qt., 1 pint.

10. Subtract 2 bu., 2 pk., 5 qt. from 6 bu., 3 pk., 4 quarts.

11. Subtract 2 T., 15 cwt., 15 lb. from 4 T., 12 cwt., 20 pounds.

12. Multiply 9 cu. yd., 8 cu. ft., 640 cu. in. by 4.

13. Multiply 6 gal., 3 qt., 1 pt. by 5.

14. Multiply 5 bu., 3 pk., 7 qt. by 2.

15. Multiply 2 T., 10 cwt., 60 lb. by 3.

16. Multiply 4 hr., 40 min., 30 sec. by 5.

17. Divide 16 sq. yd., 3 sq. ft., 141 sq. in. by 3.

18. Divide 19 cu. yd., 1 cu. ft., 216 cu. in. by 9.

19. Divide 26 gal., 3 qt., 2 gi. by 6.

20. Divide 12 bu., 1 pk., 3 qt. by 5.

21. Divide 12 T., 3 cwt., 50 lb. by 10.

1. A train traveled 32 mi., 120 rd., 7 yd., one hour, and 30 mi., 160 rd., 4 yd., the next. How far did it travel in the two hours?

2. One field contains 6 A., 80 sq. rd., and 40 sq. yd.; the field beside it contains 14 A., 120 sq. rd., $20\frac{1}{2}$ sq. yd. If the fields are joined into one, how much land will it contain?

3. A building covering 60 sq. yd., 6 sq. ft., 72 sq. in., is enlarged by an addition which covers 9 sq. yd., 8 sq. ft., 72 sq. in. What is the area covered by the entire building?

4. One room contains 185 cu. yd., 7 cu. ft., 192 cu. in. of air; another 172 cu. yd., 4 cu. ft., 432 cu. in.; a third 864 cu. yd., 2 cu. ft., 192 cu. in. If the air in all the rooms is entirely changed once every hour, how much air will be required in 1 hour?

5. A grocer had 2 gal., 2 qt., 1 pt. of vinegar in his store. He purchased 7 gal., 3 qt., 1 pt. more. How much had he then?

6. A farmer raised 56 bu., 3 pk. of Irish potatoes, and 24 bu., 2 pk. of sweet potatoes. How many had he in all?

7. One family used 1 T., 13 cwt., 50 lb. of ice in one summer; another family 1 T., 9 cwt., 75 lb. How much did both families use?

8. A steamship made the first half of a trip in 6 da., 10 hr., 45 min., and the return trip in 7 da., 3 hr., 15 min. 2 da., 6 hr., 30 min. were spent in port before returning. How long was the ship away from the starting-point?

9. A boy rode 10 mi., 80 rd., 4 yd. in 1 hour, and 2 mi. 120 rd., 3 yd. less the next hour. How far did he ride in the second hour?

1. A man owning a farm of 740 A. and 78 sq. rd. sold 290 A. and 98 sq. rd. How much land had he left?

2. In a bin holding 7 cu. yd. 9 cu. ft. 576 cu. in. a partition was placed separating a part holding 3 cu. yd. 18 cu. ft. 1152 cu. in. What was the capacity of the remaining part?

3. From a cistern holding 10 bbl. 14 gal. 1 qt. of water, a quantity was taken out leaving 2 bbl. 8 gal. 3 qt. in the cistern. How much was taken out?

4. From a load of grain weighing 2 T. 14 cwt. 30 lb., 1 T. 18 cwt. 80 lb. were removed. What was the weight of the remaining part?

5. A train made a trip in 14 hr. 15 min. 25 sec. Another train made the same trip in 1 hr. 50 min. 45 sec. less time. In what time was the trip made by the second train?

6. Two boats left the same port at the same time. One sailed 21 mi. 175 rd. 3 yd. while the second sailed twice as far. How far did the second one sail?

7. A building whose area was 84 sq. yd. 3 sq. ft. 72 sq. in. was torn down and another built whose area was three times that of the old one. What was the area of the new building?

8. In digging a cellar, 24 cu. yd. 3 cu. ft. 576 cu. in. of earth were excavated. It was then determined to make the cellar three times as large. How much more earth was removed? How much in all was removed?

9. A book dealer shipped 3 boxes of books. One weighed 1 cwt., 90 lb., 8 oz.; the second twice as much as the first, and the third, as much as both the others together. What was the entire weight?

(COPY OF BILL)

Chicago June 1, 1908

Albert Miller,

Bought of JOHN SAMPLE, BOOKSELLER

3	Books	@ 35	$1	05
2	Tablets	@ .10		20
4	Pencils	@ .05		20
6	Drawing Books	@ .10		60
		Total	2	05

(COPY OF RECEIPTED BILL)

Chicago, Dec. 23, 1907

Miss Edna Lane.

Bought of PRINCE'S TOY STORE

2	Dolls	@ 69	$1	38
3	Sets Toy Dishes	@ 87	2	61
1	Music Box		1	35
1½	Doz Xmas Cards	@ .54		81
1	Set Building Blocks			75
	Total		6	90

Received Payment,

Prince's Toy Store.

Copy, find amounts due on the following accounts, and receipt:

J. MANNING,

In account with D. L. PARMER, Dr.

19....

Jan.	2	To 75 lb. Rice	@	$ .04		
"	2	" 330 lb. Sugar	@	.05		
"	7	" 50 lb. Java Coffee	@	.32		
"	7	" 45 lb. Tea,	@	.60		
		Amount due, - - - -				

JAMES GILMAN,

In account with GEO. JOHNSON, Dr.

19....

May	6	To 5 Days' Work	@	$2.50		
"	13	" 12 lb. Nails	@	.03		
"	14	" 7 Panes of Glass	@	.40		
June	11	" 10 gal. Paint	@	1.00		
"	18	" Job Work on House			275	00
		Amount due, - - - - - - -				

Make bills for the following:

1. Feb. 4, Mrs. J. K. Brown bought of White, Jones & Co.:

10	lb. Sugar	@	$.05
20	" Flour	@	.04
2	" Tea	@	.60

2. Jan. 11, L. B. Hall bought of Smith Bros.:

20	pr. Boys' Boots	@	$1.75
15	" Slippers	@	1.50
25	" Ladies' Shoes	@	2.75
25	" Rubbers	@	.50

3. June 4, Messrs. Black & Co. bought of Marshall Field & Co.:

3	bolts Velvet	@	$100.00
3	" Muslin	@	37.00
2	" Calico	@	10.00

4. May 5, L. French bought of Browne, Steele & Co.:

5	yd. Silk	@	$1.75
3	" Ribbon	@	.75
7	" Velvet	@	4.50
4	papers Pins	@	.07
2	" Needles	@	.08

5. Sept. 1, J. C. Hill bought of Birch & Son:

8	Histories	@	$1.25
15	Spellers	@	.25
9	Readers	@	.40
12	Grammars	@	.60
20	Arithmetics	@	.55

6. Oct. 21, O. F. Horn bought of Taylor & Co.:

5	Coal Stoves	@	$20.00
10	Oil Stoves	@	8.00
25	lb. Nails	@	.04

Make out bills, supplying names, find the amounts, and receipt:

1.	9 lb. Ham	@	$.16
	8 " Veal	@	.12
	12 " Mutton	@	.12½
	16 " Beef	@	.14
	4 " Pork	@	.08⅓
2.	13 lb. Dried Beef	@	$.12
	25 " Codfish	@	.11
	16 " Mackerel	@	.06¼
	18 " Bacon	@	.12½
3.	30 yd. Cassimere	@	$1.75
	70 Spools Thread	@	.03½
	64 yd. Sheeting	@	.12
	45 " Calico	@	.04
	5 Table Cloths	@	2.50
4.	112 bbl. Flour	@	$6.20
	108 T. Hay	@	4.00
	250 bu. Wheat	@	.92
	130 " Corn	@	.32½
	75 " Barley	@	.85
5.	12 doz. Eggs	@	$.12½
	12 lb. Rice	@	.04
	48 " Coffee	@	.33⅓
	15 " Butter	@	.22
	32 " Cheese	@	.14

6. Pupils may take market reports from newspapers and make problems like the above, using names of local merchants or of classmates.

1. Charles sleeps $\frac{1}{3}$ of the 24 hours; is in school $\frac{1}{4}$ of the 24 hours; works for his mother $\frac{1}{24}$ of the 24 hours, and uses $\frac{1}{12}$ of the 24 in eating. How many hours does he sleep? Go to school? Work for his mother? Use in eating? Use in other ways?

2. Tom read $\frac{1}{3}$ of a book on Sunday; $\frac{1}{6}$ on Tuesday, and $\frac{1}{9}$ on Wednesday. What part was read in these 3 days? What part was not read?

3. Tom's book had 324 pages. How many pages did he read on Sunday? On Tuesday? On Wednesday? How many pages were left unread?

4. Fred bought $1\frac{1}{2}$ dozen eggs on Monday, and 3 times as many on Tuesday. On Wednesday he sold $2\frac{1}{4}$ dozen. How many dozen had he left?

5. Felix had a small fruit-stand. He bought at different times: $2\frac{1}{3}$ dozen oranges; $1\frac{5}{6}$ dozen oranges; $3\frac{2}{3}$ dozen oranges, and $5\frac{1}{2}$ dozen oranges. How many oranges did he buy each time? How many in all? How many dozen in all?

6. A clerk in a small grocery store sold these quantities of sugar: 4 pounds 4 ounces; $3\frac{1}{2}$ pounds; 5 pounds 12 ounces; $7\frac{3}{4}$ pounds. How many ounces did he sell each time? How many pounds and parts of a pound did he sell in all?

7. A woman asked the meat-market clerk for a 6-pound roast. When he had weighed it he charged her \$.78, and the meat was 12 cents a pound. How much did it weigh? How much more did it weigh than the woman required?

8. A rug 5 yd. 1 ft. long is $\frac{3}{4}$ as wide as it is long. How many feet wide is it?

1. Mary bought $\frac{1}{2}$ lb. of chocolate creams, and Anna bought $\frac{1}{4}$ lb. more than Mary. What part of a pound did Anna buy? What part of a pound did both girls buy?

2. Charles bought $1\frac{1}{2}$ lb. of sweet potatoes one day; $1\frac{3}{4}$ lb. the next day, and $2\frac{1}{2}$ lb. another day. How many pounds of sweet potatoes did he buy in the 3 days?

3. Ellen used $1\frac{1}{3}$ yd. of ribbon for her hair; $1\frac{2}{3}$ yd. for a neck ribbon, and $3\frac{5}{6}$ yd. for a sash. How many yards of ribbon did she use in all?

4. Ross had a kite string $60\frac{1}{2}$ yd. long. He gave Carl $23\frac{3}{4}$ yd. of it. How many yards were left for Ross?

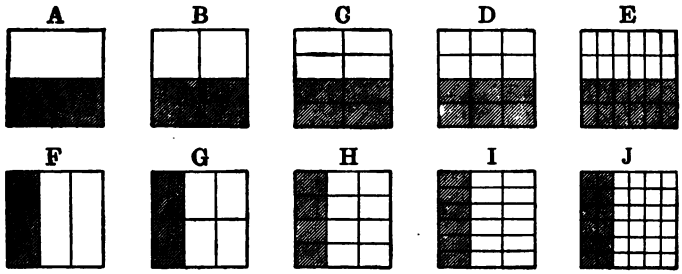
5. Grace bought $7\frac{5}{8}$ yd. of ribbon. She gave $2\frac{1}{2}$ yd. to Bessie, and $1\frac{2}{3}$ yd. to May. How many yards did Grace give away? How many yards had she left?

6. Carl had $\$5\frac{1}{2}$, and he bought a football suit for $\$4\frac{3}{4}$. What part of a dollar had he left?

7. Nellie's mother canned $3\frac{3}{4}$ pk. of pears; $1\frac{5}{8}$ pk. of peaches; $2\frac{3}{8}$ pk. of plums, and $3\frac{1}{2}$ pk. in all of different kinds of berries. How many pecks of fruit had she canned in all?

8. Four sizes of jars were on a shelf. The first size held $\frac{1}{2}$ pint; the second held $1\frac{1}{2}$ times as much as the first; the third held twice as much as the second, and the fourth held 4 times as much as the first. How much did the second hold? The third? The fourth? How much did 4 of the jars, 1 of each size, hold?

9. Walter spent $\frac{3}{4}$ of an hour studying his arithmetic; $\frac{1}{3}$ as long studying his spelling, and twice as long in studying his geography as in studying his spelling. How much time did he spend on the 3 studies?



1. Into how many parts is the square A, divided, and what is one part called? B? C? D? E?

2. Into how many parts is the square, F, divided, and what is one part called? G? H? I? J?

3. One part of A equals how many parts of B? Of C? Of D? Of E? Of G? Of I? Of J?

4. One part of F equals how many parts of G? Of H? Of I? Of J? Of D? Of E?

The number below the line of a fraction is the denominator, and indicates into how many equal parts anything is divided.

Thus, as one of the parts of B is $\frac{1}{4}$, the denominator, $\frac{}{4}$, shows that B is divided into 4 equal parts; as one part of G is $\frac{1}{6}$, the denominator, $\frac{}{6}$, shows that G is divided into 6 equal parts; etc.

The number above the line is the numerator, and indicates how many parts are taken.

Thus, in $\frac{2}{4}$ of B, the numerator, $\frac{2}{}$, shows that 2 of the 4 equal parts are taken; in $\frac{2}{6}$ of G, the numerator, $\frac{2}{}$, shows that 2 of the 6 equal parts are taken; etc.

5. What is the sum of $\frac{1}{2}$ and $\frac{1}{4}$? $\frac{1}{2}$ and $\frac{1}{8}$? $\frac{1}{2}$ and $\frac{1}{24}$? $\frac{1}{2}$ and $\frac{1}{6}$? $\frac{1}{2}$ and $\frac{1}{18}$? How did you add $\frac{1}{2}$ and $\frac{1}{8}$?

6. What must be true of the denominators of fractions in order that the fractions can be added?

1. Add $\frac{1}{2}$ and $\frac{1}{3}$. Study the square, G, p. 317.

2. In $\frac{1}{2}$ there are how many $\frac{1}{6}$'s? In $\frac{1}{3}$ there are how many $\frac{1}{6}$'s?

3. How many $\frac{1}{6}$'s are there in $\frac{1}{2}$ and $\frac{1}{3}$ together?

4. What is the difference between $\frac{1}{2}$ and $\frac{1}{4}$?

5. What is the difference between $\frac{1}{2}$ and $\frac{1}{6}$?

6. What is the difference between $\frac{1}{3}$ and $\frac{1}{6}$?

7. What is the difference between $\frac{1}{2}$ and $\frac{1}{3}$?

8. What is the sum of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$?

9. What is the sum of $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{8}$? $\frac{1}{3}$ and $\frac{1}{9}$?

10. What is the sum of $\frac{1}{6}$ and $\frac{1}{9}$? $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{9}$?

11. What is the difference between $\frac{1}{2}$ and $\frac{1}{9}$?

12. What is the difference between $\frac{1}{3}$ and $\frac{1}{8}$?

13. What is the difference between $\frac{1}{2}$ and $\frac{3}{8}$? Between $\frac{2}{3}$ and $\frac{1}{2}$? Between $\frac{3}{4}$ and $\frac{1}{2}$? Between $\frac{5}{8}$ and $\frac{1}{4}$? Between $\frac{5}{6}$ and $\frac{1}{3}$?

14. If $\frac{3}{4}$ of a yard of ribbon costs 21¢, what is the cost of $\frac{1}{4}$ of a yard? The cost of $\frac{1}{2}$ of a yard equals what part of the cost of $\frac{3}{4}$ of a yard?

15. John worked $\frac{1}{2}$ of the day Monday; $\frac{3}{4}$ of the day Tuesday, and $\frac{1}{3}$ of the day Wednesday. How many days did he work altogether?

16. A girl having $\frac{3}{4}$ yard of ribbon bought $\frac{1}{8}$ yard more. What part of a yard had she then?

17. If from $\frac{7}{8}$ of a gallon of milk $\frac{1}{4}$ of a gallon is taken, what part of a gallon is left?

18. A boy studied $1\frac{1}{2}$ hours Monday, $1\frac{1}{4}$ hours Tuesday, and $1\frac{7}{8}$ hours Wednesday. How long did he study during the three days? How much longer Monday than Tuesday? How much longer Wednesday than Monday? How much longer Wednesday than Tuesday?

1. If $\frac{2}{3}$ of a yard of cloth cost \$.96, how much will $\frac{1}{6}$ of a yard cost?

2. A girl walked $\frac{2}{3}$ of a mile north, and then $\frac{1}{6}$ of a mile east. What part of a mile did she walk in all?

3. A man traveled $1\frac{1}{6}$ miles east, and returned. He then went $\frac{1}{2}$ mile west. How far did he travel?

4. From a piece of cloth $24\frac{2}{3}$ yd. long, $6\frac{1}{3}$ yd. were sold to one customer and $8\frac{1}{6}$ yd. to another. How many yards remained?

5. One box weighs $5\frac{1}{2}$ lb.; a second, 3 times as much as the first, and a third, $\frac{1}{2}$ as much as the second. What is the weight of the second box? The third box?

6. A family uses $3\frac{1}{2}$ cwt. of ice one week; $2\frac{1}{3}$ cwt. the next week. How much do they use in the 2 weeks?

7. How many jars holding $\frac{1}{3}$ of a gal. each can be filled from $3\frac{2}{3}$ gal. of water?

8. A boy attends school $\frac{5}{6}$ of the year; $\frac{1}{2}$ of his vacation is spent in the country. What part of the year does he spend in the country?

9. A milkman sells $\frac{3}{4}$ of a pt. of cream and $1\frac{1}{2}$ qt. of milk a day to each of 2 families. How much cream does he sell to both in four days? How much milk?

10. One girl was absent from school $\frac{1}{3}$ of a month; another girl was absent $\frac{1}{2}$ as long. What part of the month was the second girl absent?

11. How many bean bags, each requiring $\frac{1}{8}$ of a yd. of cloth, can be made from $\frac{1}{4}$ of a yd.? From $\frac{1}{2}$ a yd.? From $\frac{3}{4}$ of a yd.? $\frac{7}{8}$ of a yard?

12. A traveler spent $\frac{3}{4}$ yr. in England; $\frac{1}{3}$ yr. in France; $\frac{1}{6}$ yr. in Germany, and $\frac{3}{4}$ yr. in Italy. How many years did he spend in the four countries?

1. A woman used $4\frac{1}{2}$ qt. of berries; $3\frac{1}{4}$ qt. of currants, and $2\frac{1}{8}$ qt. of cherries. How many quarts of fruit did she use?

2. In making a garden, a man planted $\frac{1}{4}$ A. in cabbages; $\frac{1}{8}$ A. in peas; $\frac{1}{16}$ A. in beans, and $\frac{1}{32}$ A. in tomatoes. How much land did he plant in all?

3. A girl spent $\frac{1}{3}$ of the summer in the country; $\frac{2}{9}$ of the summer in the mountains, and the rest of it at home. What part of the summer was she at home?

4. While canning peaches, a woman cut 12 peaches into halves and 12 into thirds. How many halves were there? How many thirds? How many more thirds than halves? How many thirds equal four halves? Six halves? Eight halves?

5. A man traveled $\frac{1}{3}$ of a certain distance by boat; $\frac{4}{9}$ by train and walked $\frac{1}{2}$ the remaining distance. What part of the distance did he walk?

6. From a lot of $5\frac{1}{2}$ doz. pairs of shoes, $2\frac{1}{4}$ doz. were sold at one price, and the rest at another price. How many dozen were sold at the second price?

7. A man removed $1\frac{1}{9}$ yd. of fence from a fence $4\frac{1}{2}$ yd. long. How many yards of fence remained?

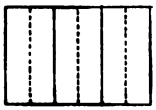
8. The area of a building was $30\frac{1}{4}$ sq. yd. An addition, $\frac{1}{3}$ as large as the building, was made. What was the area of the addition?

9. A boy spent $\frac{3}{4}$ of every year at college, for 4 years. How much time did he spend there in all?

10. A carpenter bought 528 ft. of lumber; used $\frac{1}{4}$ of it; sold $\frac{1}{3}$ of the remainder, and stored what was left. What part did he sell? What part did he keep? How many feet did he keep?

1. $\frac{1}{3} + \frac{1}{6} = ?$ $\frac{1}{3} - \frac{1}{6} = ?$

A



Show $\frac{1}{3}$ of the rectangle, A; $\frac{1}{6}$ of it.

Into how many equal parts is the rectangle divided?

What part of the rectangle is one of these parts? Two of them?

How many $\frac{1}{6}$'s are there in $\frac{1}{3}$ of the rectangle? In $\frac{1}{3} + \frac{1}{6}$ of it? In $\frac{1}{3} - \frac{1}{6}$ of it?

2. Solve, using the rectangle A, if necessary:

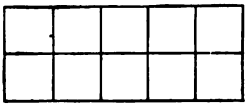
(1) $\frac{2}{3} + \frac{1}{6} = ?$ (4) $\frac{1}{3} - \frac{1}{6} = ?$ (7) $\frac{1}{2} + \frac{1}{3} = ?$

(2) $\frac{2}{3} - \frac{1}{6} = ?$ (5) $\frac{5}{6} - \frac{2}{3} = ?$ (8) $\frac{1}{2} - \frac{1}{3} = ?$

(3) $\frac{1}{3} + \frac{1}{6} = ?$ (6) $\frac{5}{6} - \frac{1}{3} = ?$ (9) $\frac{2}{3} - \frac{1}{2} = ?$

3. $\frac{2}{5} + \frac{3}{10} = ?$ $\frac{2}{5} - \frac{3}{10} = ?$

B



Show $\frac{1}{5}$ of the rectangle, B; $\frac{2}{5}$ of it; $\frac{1}{10}$ of it; $\frac{3}{10}$ of it.

Into how many equal parts is the rectangle divided?

One of these parts is what part of the rectangle?

How many $\frac{1}{10}$'s are there in $\frac{1}{5}$ of the rectangle? In $\frac{2}{5}$ of it? In $\frac{2}{5} + \frac{3}{10}$ of it? In $\frac{2}{5} - \frac{3}{10}$ of it?

4. Solve, using the rectangle B, if necessary:

(1) $\frac{3}{5} + \frac{1}{10} = ?$ (4) $\frac{4}{5} - \frac{1}{2} = ?$ (7) $\frac{1}{2} + \frac{1}{5} = ?$

(2) $\frac{2}{5} - \frac{1}{10} = ?$ (5) $\frac{1}{2} + \frac{3}{10} = ?$ (8) $\frac{1}{2} + \frac{1}{10} = ?$

(3) $\frac{2}{5} + \frac{2}{10} = ?$ (6) $\frac{7}{10} - \frac{3}{5} = ?$ (9) $\frac{1}{2} - \frac{1}{5} = ?$

5. Solve, using a divided rectangle if necessary:

(1) $\frac{1}{4} + \frac{1}{2} = ?$ (7) $\frac{5}{6} - \frac{5}{12} = ?$ (13) $\frac{4}{5} + \frac{2}{15} = ?$

(2) $\frac{3}{4} - \frac{3}{8} = ?$ (8) $\frac{3}{7} + \frac{2}{21} = ?$ (14) $\frac{3}{4} + \frac{3}{16} = ?$

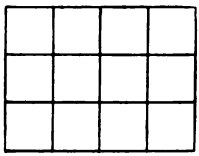
(3) $\frac{2}{3} - \frac{1}{6} = ?$ (9) $\frac{1}{6} + \frac{5}{18} = ?$ (15) $\frac{3}{4} + \frac{7}{20} = ?$

(4) $\frac{1}{5} + \frac{3}{10} = ?$ (10) $\frac{4}{9} - \frac{5}{18} = ?$ (16) $\frac{5}{7} - \frac{3}{14} = ?$

(5) $\frac{8}{9} - \frac{2}{3} = ?$ (11) $\frac{7}{8} + \frac{1}{24} = ?$ (17) $\frac{9}{10} - \frac{3}{20} = ?$

(6) $\frac{5}{8} + \frac{3}{16} = ?$ (12) $\frac{7}{9} - \frac{1}{27} = ?$ (18) $\frac{12}{13} - \frac{3}{26} = ?$

1. $\frac{3}{4} + \frac{2}{3} = ?$ $\frac{3}{4} - \frac{2}{3} = ?$



Show $\frac{1}{4}$ of the rectangle; $\frac{2}{4}$ of it; $\frac{3}{4}$; $\frac{1}{3}$; $\frac{2}{3}$.

Into how many squares is the rectangle divided? One of these squares is what part of the rectangle?

How many $\frac{1}{12}$'s are there in $\frac{1}{4}$ of the rectangle? In $\frac{3}{4}$? In $\frac{1}{3}$? In $\frac{2}{3}$? In $\frac{3}{4} + \frac{2}{3}$? In $\frac{3}{4} - \frac{2}{3}$?

2. Find the following sums and differences, using a divided rectangle when needed:

(1) $\frac{3}{5} + \frac{2}{3}$	(6) $\frac{5}{7} - \frac{2}{3}$	(11) $\frac{3}{5} + \frac{1}{4}$	(16) $\frac{5}{8} + \frac{3}{7}$
(2) $\frac{4}{5} + \frac{2}{3}$	(7) $\frac{5}{6} - \frac{2}{5}$	(12) $\frac{3}{5} + \frac{3}{7}$	(17) $\frac{5}{8} - \frac{3}{7}$
(3) $\frac{5}{6} + \frac{2}{5}$	(8) $\frac{1}{6} - \frac{1}{7}$	(13) $\frac{5}{6} - \frac{3}{5}$	(18) $\frac{3}{8} + \frac{1}{6}$
(4) $\frac{1}{6} + \frac{1}{7}$	(9) $\frac{4}{5} + \frac{2}{7}$	(14) $\frac{5}{6} + \frac{1}{7}$	(19) $\frac{3}{7} + \frac{4}{5}$
(5) $\frac{4}{5} - \frac{2}{3}$	(10) $\frac{4}{5} - \frac{2}{7}$	(15) $\frac{7}{8} - \frac{2}{3}$	(20) $\frac{6}{11} + \frac{5}{6}$

3. How may the denominator of the sum, or difference, of two fractions be found from the given denominators more quickly than by drawing and dividing a rectangle and counting its parts?

4. Compare $\frac{4}{5} + \frac{2}{3}$ with $\frac{4 \times 3}{5 \times 3} + \frac{2 \times 5}{3 \times 5}$, or $\frac{12}{15} + \frac{10}{15}$, or $\frac{22}{15}$, or $1\frac{7}{15}$.

Compare $\frac{4}{5} - \frac{2}{3}$ with $\frac{4 \times 3}{5 \times 3} - \frac{2 \times 5}{3 \times 5}$, or $\frac{12}{15} - \frac{10}{15}$, or $\frac{2}{15}$.

5. If the denominator of a fraction is multiplied by a number, what must be done to its numerator that the value of the fraction may not be changed?

6. In this way find the following sums and differences:

(1) $\frac{5}{6} + \frac{2}{5}$	(5) $\frac{3}{8} + \frac{1}{5}$	(9) $\frac{6}{10} + \frac{4}{5}$	(13) $\frac{11}{12} - \frac{8}{11}$
(2) $\frac{5}{6} - \frac{2}{5}$	(6) $\frac{3}{8} - \frac{1}{5}$	(10) $\frac{4}{5} - \frac{2}{7}$	(14) $\frac{11}{12} + \frac{9}{11}$
(3) $\frac{4}{5} + \frac{1}{3}$	(7) $\frac{7}{9} + \frac{1}{4}$	(11) $\frac{11}{12} - \frac{3}{5}$	(15) $\frac{7}{16} - \frac{2}{9}$
(4) $\frac{4}{5} - \frac{1}{3}$	(8) $\frac{7}{9} - \frac{1}{4}$	(12) $\frac{11}{12} + \frac{2}{5}$	(16) $\frac{12}{19} + \frac{15}{20}$

1. Solve:

(1) $2\frac{1}{2} + 1\frac{1}{4} = ?$ (4) $5\frac{2}{3} + 2\frac{1}{6} = ?$ (7) $8\frac{3}{4} - 6\frac{1}{2} = ?$

(2) $3\frac{1}{4} + 1\frac{1}{12} = ?$ (5) $4\frac{3}{8} + 1\frac{1}{4} = ?$ (8) $9\frac{3}{5} - 7\frac{1}{10} = ?$

(3) $8\frac{3}{4} + 2\frac{1}{8} = ?$ (6) $6\frac{1}{2} - 3\frac{1}{4} = ?$ (9) $4\frac{1}{2} - 2\frac{1}{6} = ?$

A number like $8\frac{3}{4}$, which is made up of a whole number and a fraction, is called a mixed number.

To add or subtract mixed numbers, first add or subtract the fractions, then add or subtract the whole numbers, and then add the two results.

2. (1) $9\frac{3}{4} + 6\frac{2}{3} = ?$

$9\frac{3}{4} = 9\frac{9}{12}$

$6\frac{2}{3} = 6\frac{8}{12}$

$15\frac{17}{12} = 15 + 1\frac{5}{12} = 16\frac{5}{12}$

(2) $9\frac{3}{4} - 6\frac{4}{5} = ?$

$9\frac{3}{4} = 9\frac{15}{20} = 8\frac{35}{20}$

$6\frac{4}{5} = 6\frac{16}{20} = 6\frac{16}{20}$

$2\frac{19}{20}$

Why is the minuend, $9\frac{15}{20}$, in (2) changed to $8\frac{35}{20}$?

3. Solve in like manner:

(1) $6\frac{2}{3} + 2\frac{4}{5} = ?$ (5) $8\frac{1}{3} - 5\frac{2}{3} = ?$ (9) $18\frac{7}{8} + 6\frac{9}{10} = ?$

(2) $5\frac{1}{8} + 3\frac{2}{3} = ?$ (6) $10\frac{1}{2} - 8\frac{4}{5} = ?$ (10) $20\frac{2}{5} - 15\frac{4}{5} = ?$

(3) $4\frac{1}{4} - 2\frac{1}{2} = ?$ (7) $12\frac{1}{2} - 6\frac{2}{3} = ?$ (11) $33\frac{1}{3} - 16\frac{2}{3} = ?$

(4) $12\frac{2}{3} - 6\frac{3}{4} = ?$ (8) $15\frac{5}{6} + 7\frac{1}{3} = ?$ (12) $66\frac{2}{3} - 6\frac{1}{4} = ?$

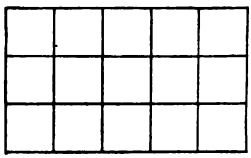
4. Henry Adams has $5\frac{3}{4}$ A. of land in one field and $10\frac{5}{8}$ A. in another. How much land has he in both fields?

5. Fred drives $5\frac{3}{4}$ miles on Monday; $3\frac{3}{8}$ miles on Tuesday, and $6\frac{1}{2}$ miles on Wednesday. How far does he drive in the three days?

6. One man works $4\frac{1}{2}$ days and another $3\frac{2}{3}$ days. How much longer does the first work than the second?

7. From a bin containing $5\frac{5}{8}$ bushels of corn $3\frac{1}{4}$ bushels were removed at one time, and $1\frac{1}{2}$ bushels at another. How many bushels then remained in the bin?

1. $2 \times \frac{1}{3}$ of the rectangle equals what part of it?



2. $3 \times \frac{1}{5} = ?$ $2 \times \frac{2}{5} = ?$ $4 \times \frac{2}{15} = ?$

Such an expression as $\frac{2}{3} \times \frac{4}{5}$ means $\frac{2}{3}$ times $\frac{4}{5}$, but it may be read "$\frac{2}{3}$ of $\frac{4}{5}$."

3. $\frac{2}{3} \times \frac{4}{5}$, or $\frac{2}{3}$ of $\frac{4}{5} = ?$

Show $\frac{1}{3}$ of the rectangle; $\frac{4}{5}$ of it; $\frac{1}{3}$ of $\frac{4}{5}$ of it.

What part of the whole rectangle is one of the small squares? How many of these squares are there in $\frac{1}{3}$ of $\frac{4}{5}$ of the rectangle? What part of the whole rectangle is $\frac{1}{3}$ of $\frac{4}{5}$ of it? $\frac{2}{3}$ of $\frac{4}{5}$ of it? $\frac{2}{3} \times \frac{4}{5} = ?$

4. Solve: (1) $\frac{1}{3} \times \frac{1}{5} = ?$ (2) $\frac{1}{2} \times \frac{5}{6} = ?$ (3) $\frac{2}{3} \times \frac{1}{6} = ?$

5. $\frac{3}{4} \times \frac{5}{6} = ?$

Divide any rectangle into 6 equal parts by lines running across it one way, and into 4 equal parts by lines running across it the other way. Show first, what part of the whole rectangle $\frac{1}{4}$ of $\frac{5}{6}$ of it is, and then what part $\frac{3}{4}$ of $\frac{5}{6}$ of it is. $\frac{3}{4}$ of $\frac{5}{6} = ?$ Show on a rectangle that $\frac{1}{2}\frac{5}{4} = \frac{5}{8}$.

6. Solve:

(1) $\frac{2}{3} \times \frac{4}{7} = ?$ (3) $\frac{6}{7} \times \frac{8}{11} = ?$ (5) $\frac{3}{4} \times \frac{7}{8} = ?$

(2) $\frac{2}{5} \times \frac{1}{3} = ?$ (4) $\frac{5}{12} \times \frac{7}{8} = ?$ (6) $\frac{3}{2} \times \frac{5}{7} = ?$

7. Compare the product of the numerators of the fractions in each exercise in problem 6 with the numerator of the result. Compare the product of the denominators of the fractions in each exercise in problem 6 with the denominator of the result.

How may the product of two fractions be found quickly?

8. Solve by the quicker method:

(1) $\frac{5}{6} \times \frac{7}{8} = ?$ (3) $\frac{6}{7} \times \frac{8}{13} = ?$ (5) $\frac{4}{5} \times \frac{4}{5} = ?$

(2) $\frac{5}{7} \times \frac{11}{12} = ?$ (4) $\frac{12}{13} \times \frac{11}{13} = ?$ (6) $\frac{7}{8} \times \frac{17}{19} = ?$

1. How many $\frac{3}{16}$-lb. packages can be made from $\frac{15}{16}$ of a pound of pepper?

2. John worked $\frac{3}{5}$ of a week and Joe $\frac{4}{5}$ of a week at the same weekly salary. What part of Joe's pay for the week did John's pay equal?

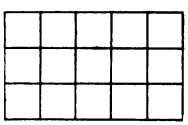
3. Compare $\frac{3}{5} \div \frac{4}{5}$, with $\frac{\frac{3}{5}}{\frac{4}{5}}$, or $\frac{3 \text{ fifths}}{4 \text{ fifths}}$, or $\frac{3}{4}$.

4. Solve:

(1) $\frac{4}{5} \div \frac{2}{5} = ?$ (3) $\frac{7}{9} \div \frac{2}{9} = ?$ (5) $\frac{1}{2} \div \frac{1}{4} = ?$

(2) $\frac{8}{9} \div \frac{2}{9} = ?$ (4) $\frac{7}{11} \div \frac{2}{11} = ?$ (6) $\frac{3}{4} \div \frac{1}{8} = ?$

5. $\frac{3}{5} \div \frac{2}{3} = ?$



Divide a rectangle into 5 equal parts by lines running across it one way, and into 3 equal parts by lines running across it the other way.

Into how many equal parts is the rectangle then divided?

What part of the whole rectangle is one of them?

To how many $\frac{1}{15}$'s is $\frac{3}{5}$ equal? $\frac{2}{3}$? $\frac{9}{15} \div \frac{10}{15} = ?$ $\frac{3}{5} \div \frac{2}{3} = ?$

6. How may two fractions be changed to equivalent fractions having the same denominator, in a quicker way than by using a divided rectangle? (Prob. 3, p. 324.)

SOLUTION:

7. $\frac{2}{3} \div \frac{3}{4} = ?$ $\frac{2}{3} = \frac{8}{12}$. $\frac{3}{4} = \frac{9}{12}$. $\frac{8}{12} \div \frac{9}{12} = \frac{8}{9}$.

8. Solve:

(1) $\frac{1}{6} \div \frac{2}{3} = ?$ (7) $\frac{12}{13} \div \frac{1}{2} = ?$ (13) $\frac{5}{6} \div \frac{7}{9} = ?$

(2) $\frac{7}{18} \div \frac{2}{9} = ?$ (8) $\frac{3}{7} \div \frac{4}{5} = ?$ (14) $\frac{1}{4} \div \frac{5}{6} = ?$

(3) $\frac{5}{7} \div \frac{2}{21} = ?$ (9) $\frac{1}{2} \div \frac{6}{11} = ?$ (15) $\frac{3}{5} \div \frac{1}{3} = ?$

(4) $\frac{7}{8} \div \frac{3}{4} = ?$ (10) $\frac{5}{7} \div \frac{2}{3} = ?$ (16) $\frac{9}{10} \div \frac{2}{15} = ?$

(5) $\frac{8}{9} \div \frac{2}{5} = ?$ (11) $\frac{3}{4} \div \frac{4}{5} = ?$ (17) $\frac{7}{9} \div \frac{4}{27} = ?$

(6) $\frac{6}{7} \div \frac{3}{5} = ?$ (12) $\frac{11}{12} \div \frac{7}{8} = ?$ (18) $\frac{21}{25} \div \frac{3}{4} = ?$

In a certain town hard coal costs $7.25 a ton during April. The price then rises 10 cents a ton on the first day of each following month for 5 months, and remains at this figure until the first day of the next April.

1. What does coal cost per ton in this town during May? During June? During July? August? September? October? November? December? January? February? March?

2. If a man buys hard coal in April what must he pay for 2 tons? For 3 tons? For 5 tons? For 6 tons? For 8 tons?

3. How much must a man pay for 3 tons of coal, if he buys it some time in May? In June? In July? August? September? October? December? January? February?

4. How many tons of hard coal could a man buy during April for $14.50? For $29? For $58? For $72.25? For $87?

5. How many tons of hard coal could a man buy during May for $14.70? For $29.40? For $44.10? For $88.20? For $58.80? For $132.80?

6. The retail dealer pays $1 less per ton than he sells the coal for to the people who use it. How much must he pay for 1 car load of 40 tons in April? In May? In June? In December?

7. The retail dealer bears whatever loss occurs while the car is being brought from the mines. How much does he make on the carload of 40 tons, weighed at the mines, if the car actually contained only 38 tons when it reached him?

8. How much money does a man save who invests in 10 tons of coal in April to be burned in July? In October? In November?

1. What part of a dollar is 50¢? 25¢? 10¢? 1¢?

2. How do you write 1¢ as a fraction of a dollar? How do you write it with the dollar sign ($)?

3. How do you write 10¢ as a fraction of a dollar? With the dollar sign?

4. How do you write 25¢ as a fraction of a dollar? With the dollar sign? 50¢ as a fraction of a dollar? With the dollar sign?

5. Write as hundredths (100ths) of a dollar:

$.01 $.07 $.15 $.25 $.39 $.75 $.87

6. Write the following as 100ths, and as tenths (10ths) of a dollar:

$.10 $.30 $.50 $.70 $1.10 $1.50 $2.60

The period used between the figures in writing dollars and cents is called the decimal point.

7. Write each of the following as a common fractional part of a dollar, and also as a decimal part of a dollar:

1¢; 10¢; 25¢; 50¢; 75¢; 120¢; 150¢.

Numbers when written with the decimal point are read exactly as when written as fractions.

$\frac{3}{100}$ of a dollar is read *three-hundredths* of a dollar.

.03 of a dollar is read *three-hundredths* of a dollar.

$\frac{25}{100}$ of a dollar is read *twenty-five-hundredths* of a dollar.

.25 of a dollar is read *twenty-five-hundredths* of a dollar.

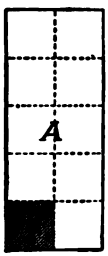
$\frac{5}{10}$ of a dollar is read *five-tenths* of a dollar.

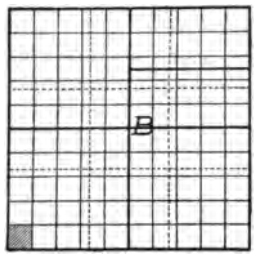
.5 of a dollar is read *five-tenths* of a dollar.

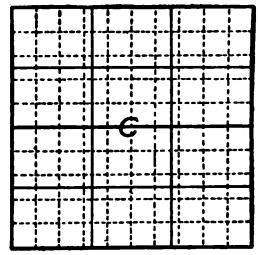
8. Read the following numbers as parts of a dollar:

.05 .18 .45 .06 .23 .75 .3 .02 .6 .72 .93 .15 .8 .9 .44 .12

9. Write each of the decimal fractions in problem 8 in the form of a common fraction.







1. What part of the rectangle, A, is shaded? Not shaded?

2. Show from A how many tenths (10ths) there are in $\frac{1}{2}$. In $\frac{2}{2}$. In $\frac{1}{5}$. In $\frac{2}{5}$. In $\frac{3}{5}$. In $\frac{4}{5}$. In $\frac{5}{5}$.

3. Write these fractions as 10ths: $\frac{1}{2}$ $\frac{2}{2}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{5}{5}$

4. What part of the square, B, is shaded? Not shaded?

5. Show from B how many hundredths (100ths) there are in 1. In $\frac{1}{2}$. In $\frac{2}{2}$. In $\frac{1}{4}$. In $\frac{3}{4}$.

6. Show how many 100ths there are in $\frac{1}{5}$. $\frac{2}{5}$. $\frac{3}{5}$. $\frac{4}{5}$. $\frac{5}{5}$.

7. Write as 100ths: $\frac{1}{2}$ $\frac{2}{2}$ $\frac{1}{10}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{3}{4}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{7}{10}$

Another way of writing $\frac{2}{10}$, $\frac{3}{10}$, $\frac{5}{10}$, is .2, .3, .5.

Another way of writing $\frac{25}{100}$, $\frac{45}{100}$, $\frac{75}{100}$, and so forth, is .25, .45, .75, and so forth.

When 10ths, or 100ths are written in the second way they are called *decimal fractions*, or *decimals*.

The fractions are said to be written decimally.

The decimal, .7, is read "7 *tenths*," and .37 is read "37 *hundredths*."

8. Write the following fractions decimally, and then read them:

$\frac{3}{10}$ $\frac{8}{10}$ $\frac{9}{10}$ $\frac{12}{10}$ $\frac{20}{100}$ $\frac{35}{100}$ $\frac{50}{100}$ $\frac{66}{100}$ $\frac{78}{100}$ $\frac{97}{100}$

9. Write the following decimals as common fractions, and then read them:

.4 .9 .13 .18 .26 .48 .67 .50 .25 .79 .86

1. $\frac{1}{3}$ of the square, B, (page 328) equals how many 100ths of B? $33\frac{1}{3}$ hundredths is written $.33\frac{1}{3}$.

2. $\frac{2}{3}$ of the square, B, equals how many 100ths of B?

3. Write $66\frac{2}{3}$ hundredths without the word, *hundredths*.

4. How many 100ths of B equals $\frac{1}{8}$ of B? $\frac{2}{8}$ of B? $\frac{3}{8}$ of B? $\frac{5}{8}$ of B? $\frac{7}{8}$ of B?

5. Write the following common fractions as decimals:

$$\frac{33\frac{1}{3}}{100} \quad \frac{66\frac{2}{3}}{100} \quad \frac{12\frac{1}{2}}{100} \quad \frac{37\frac{1}{2}}{100} \quad \frac{62\frac{1}{2}}{100} \quad \frac{87\frac{1}{2}}{100}$$

6. $\frac{1}{6}$ of the square, C (page 328), equals how many 100ths of C?

7. $\frac{5}{6}$ of the square C, equals how many 100ths of C?

8. Write $16\frac{2}{3}$, and $83\frac{1}{3}$ decimally.

9. Show from C how many 100ths $\frac{1}{12}$ equals; $\frac{5}{12}$; $\frac{7}{12}$, $\frac{11}{12}$.

10. Write the following decimals as common fractions:

$.27 \quad .33 \quad .67\frac{1}{2} \quad .72\frac{1}{2} \quad .22\frac{1}{2} \quad .44\frac{4}{9} \quad .77\frac{7}{9}$

11. Write as decimals, and then read:

$$\frac{8\frac{1}{3}}{100} \quad \frac{14\frac{2}{7}}{100} \quad \frac{41\frac{2}{3}}{100} \quad \frac{42\frac{6}{7}}{100} \quad \frac{58\frac{1}{3}}{100} \quad \frac{71\frac{3}{7}}{100} \quad \frac{91\frac{2}{3}}{100}$$

12. Show how many 100ths $\frac{1}{9}$ of the square, B, equals.

13. How many 100ths of B do these equal:

$\frac{1}{9} \quad \frac{2}{9} \quad \frac{3}{9} \quad \frac{1}{3} \quad \frac{4}{9} \quad \frac{5}{9} \quad \frac{2}{3} \quad \frac{6}{9} \quad \frac{7}{9} \quad \frac{8}{9} \quad \frac{9}{9}$

14. Write the decimal equivalents of the following:

$$\frac{11\frac{1}{9}}{100} \quad \frac{22\frac{2}{9}}{100} \quad \frac{33\frac{1}{3}}{100} \quad \frac{44\frac{4}{9}}{100} \quad \frac{55\frac{5}{9}}{100} \quad \frac{66\frac{2}{3}}{100} \quad \frac{77\frac{7}{9}}{100}$$

15. Write the following decimals as common fractions:

$.08\frac{1}{3} \quad .15\frac{1}{2} \quad .14\frac{1}{3} \quad .38\frac{1}{3} \quad .77\frac{1}{7} \quad .85\frac{3}{4} \quad .20\frac{5}{8}$

16. Give the decimal equivalents of

$\frac{1}{2} \quad \frac{1}{4} \quad \frac{1}{3} \quad \frac{3}{4} \quad \frac{2}{3} \quad \frac{1}{5} \quad \frac{2}{5} \quad \frac{3}{5} \quad \frac{4}{5} \quad \frac{1}{12} \quad \frac{5}{12} \quad \frac{7}{12}$

1. Express the following common fractions in the form of decimal fractions:

$\frac{3}{100}$ bu. $\frac{7}{10}$ ft. $\frac{6}{10}$ hr.

$\frac{4}{10}$ gal. $\frac{25}{100}$ ton. $\$\frac{37}{100}$

2. Write as decimal fractions the following:

$\frac{94}{100}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{9}{10}$	$\frac{6}{10}$
$\frac{7}{10}$	$\frac{86}{100}$	$\frac{15}{100}$	$\frac{12}{100}$	$\frac{2}{100}$
$\frac{18}{100}$	$\frac{19}{100}$	$\frac{9}{100}$	$\frac{6}{100}$	$\frac{2}{10}$

3. .25 of a dollar equals how many cents?

4. A farmer sold .3 of a flock of 350 sheep. How many did he sell?

5. A piece of cloth 10 yd. long was sold to two customers, one buying .5 of it, the other buying the rest. How many yards did each one take?

6. A boy traveled 100 miles, going .2 of the way by boat. How many miles did he go by boat?

7. If .07 of the contents of a cistern holding 500 gal. were drawn off, how many gallons were drawn off?

8. A man bought .75 of a quantity of grain measuring 400 bu. How many bu. did he buy?

$4\frac{7}{10}$, or 4.7 is read four *and* seven tenths.

$204\frac{9}{100}$, or 204.09 is read two hundred four *and* nine hundredths.

$234\frac{69}{100}$, or 234.69 is read two hundred thirty-four *and* sixty-nine hundredths.

9. What name is given to any figure written in the first place to the right of the decimal point? In the second place?

10. Read the following:

8.3	27.32	30.03	7.07	201.05
14.17	643.24	500.5	93.94	330.33

1. A man bought a ton of hard coal for \$6.35, a ton of soft coal for \$4.50, and a load of kindling for \$1.50. How much did the coal and kindling cost?

2. James lives .75 mi. north, and Fred, .35 mi. south of the schoolhouse. How far apart do the boys live?

3. Find the cost of 5 barrels of flour at \$4.75 a barrel.

4. One street car line has 4.85 miles of track; another 6.55 miles, and a third 7.5 miles. How many miles of track are there?

5. A farm is divided as follows: cornfield, 66.75 acres; oatfield, 42.6 acres; meadow, 24.5 acres; grove, 20.25 acres; vegetable garden, 4.4 acres; building lot, 1.5 acres. How many acres are there in the farm?

6. A bushel of potatoes contains 47.34 lb. water, 10.8 lb. starch, .54 lb. ash, 1.26 lb. proteid, and .06 lb. fat. How much does a bushel of potatoes weigh?

47.34 lb.	Begin on the right and add as with
10.80 "	whole numbers.
.54 "	Place the decimal point (.) in the sum
1.26 "	just beneath the points in the
.06 "	numbers to be added (addends).

7. Add:

(1)	(2)	(3)	(4)
623.21	4561.38	685.329	365.250
68.75	28.17	27.602	.168
90.66	191.76	7.001	90.027
8.32	9.68	.868	106.995
4.00	3125.88	12.789	78.200
67.75	.98	1.896	9.375

TABLE SHOWING FOOD PARTS

Food	Water	Fat	Ash	Proteid	Starch
Oatmeal	.72 lb.	.73 lb.	.19 lb.	1.56 lb.	6.80 lb.
Corn-meal	1.29 "	.22 "	.07 "	.89 "	7.53 "
Rye-meal	1.27 "	.09 "	.08 "	.71 "	7.85 "
Rice	1.23 "	.03 "	.04 "	.78 "	7.92 "
Macaroni	1.08 "	.16 "	.30 "	1.17 "	7.29 "

1. How much does the water in the 5 foods weigh? The fat? The ash? The proteid? The starch?

2. How much does the oatmeal weigh? The corn-meal? The rye-meal? The rice? The macaroni?

3. What is the weight of all the parts of problem 1?

4. Ten pounds of apples contain 8.46 pounds of water and 10 pounds of bananas contain 7.53 pounds of water. How much more water is there in 10 pounds of apples than in 10 pounds of bananas?

8.46 lb.
7.53 "

First, subtract as with whole numbers. Place the decimal point in the difference just beneath the points in the minuend and subtrahend.

5. Subtract:

(1)	(2)	(3)	(4)
86.3	60.9	35.16	30.16
7.9	14.7	21.87	3.95
(5)	(6)	(7)	(8)
201.06	108.08	476.00	806.30
99.98	69.89	96.99	89.92
(9)	(10)	(11)	(12)
36.004	1008.902	101.010	600.006
9.735	86.967	90.909	589.099

1. A pound of butter contains 15.6 oz. of fat. How many ounces of fat are there in 3 pounds of butter?

2. In one pound of eggs there are 1.79 oz. of shell. How many ounces of shell are there in 5 pounds of eggs?

3. How many minutes in .05 hour?

4. A lot is 125 feet deep and 12.5 feet wide. What is its area?

5. A square-cornered box is .7 of a foot long, .5 of a foot wide and .3 of a foot deep. What is the area of the top? Of the side? Of the end? Of the entire surface?

6. Multiply:

(1) $326 \times 10 = ?$ (4) $326 \times 100 = ?$ (7) $326 \times 1000 = ?$

(2) $32.6 \times 10 = ?$ (5) $32.6 \times 100 = ?$ (8) $32.6 \times 1000 = ?$

(3) $3.26 \times 10 = ?$ (6) $3.26 \times 100 = ?$ (9) $3.26 \times 1000 = ?$

7. How may a number be multiplied quickly by 10? By 100? By 1000?

8. Multiply:

(1)	(2)	(3)	(4)	(5)	(6)
68	68	68	6.8	6.8	6.8
27	2.7	.27	27	2.7	.27
476	476	476	476	476	476
136	136	136	136	136	136
1836	183.6	18.36	183.6	18.36	1.836

9. In problem 8, how many decimal figures are there in the product of (2)? Of (3)? Of (4)? Of (5)? Of (6)?

10. In problem 8, how many decimal figures are there in both the multiplicand and multiplier of (2)? Of (3)? Of (4)? Of (5)? Of (6)?

11. How may one quickly tell how many decimal places there will be in the product of two decimals?

1. Find the product of 1235×321, and write the answers to the following without multiplying:

(1) $1235 \times 32.1 = ?$ (4) $12.35 \times 3.21 = ?$

(2) $1235 \times 3.21 = ?$ (5) $1.235 \times 321 = ?$

(3) $123.5 \times 32.1 = ?$ (6) $12.35 \times .321 = ?$

2. Solve:

(1) $32 \times 2.5 = ?$ (5) $8.5 \times .48 = ?$

(2) $45 \times 3.8 = ?$ (6) $28.6 \times 32.5 = ?$

(3) $63 \times .28 = ?$ (7) $2.86 \times 3.56 = ?$

(4) $3.9 \times 4.5 = ?$ (8) $28.6 \times 3.56 = ?$

3. Solve and express the quotients in decimal form:

(1) $253 \div 10 = ?$ (5) $253 \div 100 = ?$

$10)\overline{253}$ $100)\overline{253}$

25.3 2.53

(2) $29 \div 10 = ?$ (6) $843 \div 100 = ?$

(3) $907 \div 10 = ?$ (7) $2601 \div 100 = ?$

(4) $83 \div 10 = ?$ (8) $277 \div 100 = ?$

4. Answer the following:

(1) $\frac{1}{4}$ of 16.64 lb. $= ?$ (4) $94.5 \div 3 = ?$

(2) $\frac{1}{5}$ of \$2.25 $= ?$ (5) $9.45 \div 9 = ?$

(3) $\frac{1}{8}$ of 9.76 hr. $= ?$ (6) $.945 \div 27 = ?$

5. Divide:

(1) 864 by 36 (5) 2331 by 63

(2) 86.4 by 36 (6) 233.1 by 63

(3) 86.4 by 3.6 (7) 233.1 by 6.3

(4) 8.64 by 3.6 (8) 23.31 by 6.3

6. Solve:

(1) $86.4 \div 2.4 = ?$ (5) $25.16 \div .74 = ?$

(2) $140.4 \div 5.4 = ?$ (6) $2.491 \div .53 = ?$

(3) $425.6 \div 7.6 = ?$ (7) $13.312 \div 4.16 = ?$

(4) $101.52 \div 3.6 = ?$ (8) $83.781 \div 2.61 = ?$

1. What part of a dollar is 1 cent? 9 cents? 31 cents?

Another term for hundredths is percent.

1 hundredth of a dollar = 1 percent of a dollar.

9 hundredths of a dollar = 9 percent of a dollar.

Instead of the word, percent, the sign, %, is often used.

9 percent of a dollar may be written 9 % of a dollar.

31 percent of a dollar may be written 31 % of a dollar.

Hundredths of anything may be expressed in any of the following ways:

$\frac{17}{100}$ bu., .17 bu., 17 percent of a bu. or 17 % of a bu.

$\frac{3}{100}$ lb., .03 lb., 3 percent of a lb. or 3 % of a lb.

2. Write first with the percent sign, then as decimals:

$\frac{8}{100}$	$\frac{6}{100}$	$\frac{13}{100}$	$\frac{33}{100}$
$\frac{40}{100}$	$\frac{18}{100}$	$\frac{14}{100}$	$\frac{12}{100}$
$\frac{25}{100}$	$\frac{20}{100}$	$\frac{50}{100}$	$\frac{16}{100}$
$\frac{75}{100}$	$\frac{60}{100}$	$\frac{45}{100}$	$\frac{66}{100}$

3. Write first as common, then as decimal fractions:

10%	25%	64%	$12\frac{1}{2}$%
15%	20%	53%	$33\frac{1}{3}$%
3%	50%	2%	$16\frac{2}{3}$%
5%	75%	45%	$66\frac{2}{3}$%

4. Write first as hundredths, then with the sign, %:

.8	.25	.7	.09
.5	.14	.04	.85
.16	.75	.65	.01
.33	3.1	2.25	1.03

5. Write first as decimals, then with the sign, %:

$\frac{1}{10}$	$\frac{3}{10}$	$\frac{7}{10}$	$\frac{1}{4}$
$\frac{1}{5}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{1}{8}$
$\frac{1}{2}$	$\frac{2}{5}$	$\frac{9}{10}$	$\frac{3}{8}$
$\frac{1}{20}$	$\frac{3}{20}$	$\frac{4}{5}$	$\frac{5}{8}$

Answer all you can orally

1. How many cents in $\frac{1}{4}$ of a dollar? In $\frac{1}{2}$ dollar? $\frac{3}{4}$ dollar? $\frac{1}{8}$ dollar? $\frac{5}{8}$ dollar? $\frac{7}{8}$ dollar?

2. What percent of a dollar is $\frac{1}{4}$ of a dollar? $\frac{3}{4}$? $\frac{1}{2}$? $\frac{1}{10}$? $\frac{1}{20}$? $\frac{3}{10}$? $\frac{3}{20}$? $\frac{1}{8}$? $\frac{5}{8}$? $\frac{3}{8}$? $\frac{7}{8}$?

3. Instead of one dollar, find the same parts and percents as in problem 2 of one gallon; of one bushel; of any unit; of \$8; of \$24; of 40 marbles; of 84 acres.

4. What fractional part is 25% of any number? 10% of it? 5%? 15%? 50%? 75%? $12\frac{1}{2}$%? 20%? $37\frac{1}{2}$%? 40%?

5. How many cents is $\frac{1}{6}$ of a dollar? $\frac{5}{6}$ of a dollar? $\frac{1}{3}$ of a dollar? $\frac{2}{3}$ of a dollar?

6. What percent of a dollar is $\frac{1}{6}$ dollar? $\frac{5}{6}$ dollar?

7. What percent of a foot is $\frac{1}{6}$ of a foot? $\frac{5}{6}$ of a foot? $\frac{1}{3}$ of a foot? $\frac{2}{3}$ of a foot?

8. What percent of a yard is $\frac{1}{6}$ of a yard? $\frac{5}{6}$ of a yard? $\frac{1}{3}$ of a yard? $\frac{2}{3}$ of a yard?

9. Find $16\frac{2}{3}$% of 18 pigeons; of 24 marbles; of 30 boys. Find $83\frac{1}{3}$% of the same; $33\frac{1}{3}$%; $66\frac{2}{3}$%.

Parts as percents.

10. What is $\frac{1}{2}$ of 8? What is 50% of 8?

11. What is $\frac{1}{4}$ of 12? What is 25% of 12?

12. What is $\frac{2}{4}$, or $\frac{1}{2}$ of 12? What is 50% of 12?

13. What is $\frac{3}{4}$ of 12? What is 75% of 12?

14. What is $\frac{1}{3}$ of 12? What is $33\frac{1}{3}$% of 12?

15. What is $\frac{2}{3}$ of 18? What is $66\frac{2}{3}$% of 18?

16. What is $\frac{1}{5}$ of 40? What is 20% of 40?

17. What is $\frac{2}{5}$ of 40? What is 40% of 40?

18. What is $\frac{1}{10}$ of 60? What is 10% of 60?

19. What is $\frac{3}{10}$ of 60? What is 30% of 60?

1. What is $\frac{1}{8}$ of 24? What is $12\frac{1}{2}\%$ of 24?

2. What is $\frac{3}{8}$ of 16? What is $37\frac{1}{2}\%$ of 16?

3. What is $\frac{1}{20}$ of 80? What is 5% of 80?

4. $\frac{1}{3}$ is what percent? $\frac{1}{4}$ is what %? $\frac{1}{5}$ is what %?

5. $\frac{1}{10}$ is what percent? $\frac{1}{2}$ is what %? $\frac{1}{8}$ is what %?

6. $\frac{2}{3}$ is what percent? $\frac{3}{10}$ is what %?

7. Give a quick way of finding 50% of a number; 25% of a number; 20% of a number; $33\frac{1}{3}\%$ of a number; 10% of a number; $12\frac{1}{2}\%$ of a number.

8. Give a quick way of finding 75% of a number; $66\frac{2}{3}\%$ of a number; 40% of a number; $37\frac{1}{2}\%$ of a number.

Finding the percentage.

9. What number is 50% of 4? 50% of 2? 50% of 10? 50% of 16? 50% of 12? 50% of 28?

10. What number is 25% of 4? 25% of 12? 25% of 16? 25% of 28? 25% of 32? 25% of 40?

11. Give 75% of 4; of 8; of 20; of 36; of 40; of 6; of 14.

12. Give $33\frac{1}{3}\%$ of 3; of 12; of 15; of 24; of 39; of 48; of 42; of 4.

13. Give $66\frac{2}{3}\%$ of 3; of 12; of 15; of 24; of 48; of 4.

14. Give 10% of 20; of 30; of 80; of 25; of 35; of 42; of 86.

15. Give 30% of 20; of 30; of 80; of 10; of 25; of 42;

16. Give 40% of 5; 10; 15; 25; 35; 45; 75.

17. 50% of Fred's money is 15 cents. How much money has he?

18. 75% of the milk one family uses in a week is 9 quarts. How much milk is used? What part of the quantity used is 9 quarts?

19. $33\frac{1}{3}\%$ of the horses in a livery stable is 21. How many horses in all? What part of the whole number of horses is 21 horses?

Decimals as percents.

1. What is .10 of 30? What is 10% of 30?

2. What is .20 of 30? What is 20% of 30?

3. What is .30 of 40? What is 30% of 40?

4. What is .50 of 20? What is 50% of 20?

5. What is .25 of 8? What is 25% of 8?

6. What is .75 of 8? What is 75% of 8?

7. What is .05 of 100? What is 5% of 100?

8. What is .04 of 100? What is 4% of 100?

9. .50 is what percent? .40 is what percent?

10. .15 is what percent? .75 is what percent?

11. .25 is what percent? .33$\frac{1}{3}$ is what percent?

12. .37$\frac{1}{2}$ is what percent? .87$\frac{1}{2}$ is what percent?

13. In an orchard of 150 trees, 20% are pear trees. How many pear trees are there?

14. A dairyman had 90 lb. of butter and sold 30% of it. How many pounds of butter did he sell?

15. A man paid $45 for a bicycle and sold it at a gain of 25%. How much did he gain?

16. 300 lb. of potatoes contain 60 lb. of starch. What percent of potato is starch?

17. A farm of 160 acres contains a meadow of 32 acres. What percent of the farm is meadow?

18. In 50 lb. of oatmeal there are 30 lb. of starch. What percent of oatmeal is starch?

19. About 80% of rice is starch. About how much starch is there in 25 lb. of rice?

20. Willis bought a collection of canceled stamps at 25% of their face value. The face value of the collection was 264 cents. How much did Willis pay for the collection?

Interest as percents.

1. A farmer pays 5% of \$120 for the use of \$120 for 1 year. How many dollars does he pay for the use of the money?

2. A man pays 5½% of \$240 for the use of \$240 for a year. How many dollars does he pay for the use of the money for 1 year?

3. A man pays 6% of \$250 every year for 2 years for the use of \$250. How many dollars in all must he pay for the use of the money?

4. Find how much must be paid for the use of the following sums at the given rates for the given times:

(1) \$200 at 4% for 1 year
(2) \$320 at 3% for 1 year
(3) \$450 at 6% for 1 year
(4) \$500 at 5% for 1 year
(5) \$540 at 8% per year for ½ year
(6) \$375 at 6% per year for 2 years
(7) \$600 at 5% per year for 3 years

Interest as so many cents on the dollar.

5. A man pays 6 cents on the dollar for the use of \$80 for 1 year. How many dollars does he pay for the use of the \$80 for one year?

6. A man pays 5 cents on the dollar for the use of \$200 for 1 year. How much does he pay for the use of the money for 1 year?

Money paid for the use of money is called interest.

7. At 6 cents on the dollar what is the interest on \$5? On \$20? On \$40? On \$50?

8. At the rate of 5 cents on the dollar for every year what must one pay for the use of \$100 for 1 year? For 3 years? For 5 years? For 2 years? For 8 years?

Interest at 5 percent, 5%, means 5 cents on the dollar for each year; interest at 6% means 6 cents on the dollar for each year, and so on.

1. What is the interest at 5% on \$80 for 1 year? For 2 years? For 5 years?

2. What is the interest at 6% on \$60 for 1 year? For 3 years? For 4 years?

3. What is the interest at 4% on \$120 for 1 year? For 2 years? For 3 years?

4. What is the interest at 10% on \$40 for 1 year? For 3 years? For 5 years?

5. What is the interest at 3% on \$80 for 1 year? For 5 years? For 7 years?

6. What is the interest at 8% on \$70 for 1 year? For 2 years? For 8 years?

7. What is the interest at 7% on \$50 for 1 year? For 4 years? For $\frac{1}{2}$ year?

8. What is the interest at 2% on \$500 for 1 year? For $\frac{1}{2}$ year? For 3 years?

9. What is the interest at 9% on \$70 for 1 year? For $\frac{1}{2}$ year? For 3 years?

10. Find the interest at $5\frac{1}{2}\%$ on \$800 for 1 year; for $\frac{1}{2}$ year, for $1\frac{1}{2}$ years.

11. A man borrows \$100 for 3 years. He pays 6% interest. How much interest does he pay?

12. I borrowed \$1000 at $5\frac{1}{2}\%$ two years ago. How much interest is now due if I have paid none?

13. Find the interest at the given percents on

(1) \$850 at 6% for 2 years; for 3 years; for 7 years.

(2) \$900 at 4% for $\frac{1}{2}$ year; for $1\frac{1}{2}$ years; for 3 years.

(3) \$1000 at 5% for $1\frac{1}{2}$ years; for 3 years; for 7 years.

(4) \$1200 at $4\frac{1}{2}\%$ for 1 year; for $\frac{1}{2}$ year; for $2\frac{1}{2}$ years.

(5) \$1500 at $3\frac{1}{2}\%$ for 1 year; for 6 years; for 9 years.

(6) \$2500 at $2\frac{1}{2}\%$ for 1 year; for $\frac{1}{4}$ year; for $\frac{3}{4}$ year.

MULTIPLICATION TABLES

1 × 1 = 1	2 × 1 = 2	3 × 1 = 3	4 × 1 = 4
1 × 2 = 2	2 × 2 = 4	3 × 2 = 6	4 × 2 = 8
1 × 3 = 3	2 × 3 = 6	3 × 3 = 9	4 × 3 = 12
1 × 4 = 4	2 × 4 = 8	3 × 4 = 12	4 × 4 = 16
1 × 5 = 5	2 × 5 = 10	3 × 5 = 15	4 × 5 = 20
1 × 6 = 6	2 × 6 = 12	3 × 6 = 18	4 × 6 = 24
1 × 7 = 7	2 × 7 = 14	3 × 7 = 21	4 × 7 = 28
1 × 8 = 8	2 × 8 = 16	3 × 8 = 24	4 × 8 = 32
1 × 9 = 9	2 × 9 = 18	3 × 9 = 27	4 × 9 = 36
1 × 10 = 10	2 × 10 = 20	3 × 10 = 30	4 × 10 = 40
1 × 11 = 11	2 × 11 = 22	3 × 11 = 33	4 × 11 = 44
1 × 12 = 12	2 × 12 = 24	3 × 12 = 36	4 × 12 = 48
5 × 1 = 5	6 × 1 = 6	7 × 1 = 7	8 × 1 = 8
5 × 2 = 10	6 × 2 = 12	7 × 2 = 14	8 × 2 = 16
5 × 3 = 15	6 × 3 = 18	7 × 3 = 21	8 × 3 = 24
5 × 4 = 20	6 × 4 = 24	7 × 4 = 28	8 × 4 = 32
5 × 5 = 25	6 × 5 = 30	7 × 5 = 35	8 × 5 = 40
5 × 6 = 30	6 × 6 = 36	7 × 6 = 42	8 × 6 = 48
5 × 7 = 35	6 × 7 = 42	7 × 7 = 49	8 × 7 = 56
5 × 8 = 40	6 × 8 = 48	7 × 8 = 56	8 × 8 = 64
5 × 9 = 45	6 × 9 = 54	7 × 9 = 63	8 × 9 = 72
5 × 10 = 50	6 × 10 = 60	7 × 10 = 70	8 × 10 = 80
5 × 11 = 55	6 × 11 = 66	7 × 11 = 77	8 × 11 = 88
5 × 12 = 60	6 × 12 = 72	7 × 12 = 84	8 × 12 = 96
9 × 1 = 9	10 × 1 = 10	11 × 1 = 11	12 × 1 = 12
9 × 2 = 18	10 × 2 = 20	11 × 2 = 22	12 × 2 = 24
9 × 3 = 27	10 × 3 = 30	11 × 3 = 33	12 × 3 = 36
9 × 4 = 36	10 × 4 = 40	11 × 4 = 44	12 × 4 = 48
9 × 5 = 45	10 × 5 = 50	11 × 5 = 55	12 × 5 = 60
9 × 6 = 54	10 × 6 = 60	11 × 6 = 66	12 × 6 = 72
9 × 7 = 63	10 × 7 = 70	11 × 7 = 77	12 × 7 = 84
9 × 8 = 72	10 × 8 = 80	11 × 8 = 88	12 × 8 = 96
9 × 9 = 81	10 × 9 = 90	11 × 9 = 99	12 × 9 = 108
9 × 10 = 90	10 × 10 = 100	11 × 10 = 110	12 × 10 = 120
9 × 11 = 99	10 × 11 = 110	11 × 11 = 121	12 × 11 = 132
9 × 12 = 108	10 × 12 = 120	11 × 12 = 132	12 × 12 = 144

TABLES OF WEIGHTS AND MEASURES

LIQUID MEASURE

4 gills (gi.)	= 1 pint	(pt.)
2 pints	= 1 quart	(qt.)
4 quarts	= 1 gallon	(gal.)
1 gallon	= 231 cubic inches	
31½ gallons	= 1 barrel	(bbl.)

DRY MEASURE

2 pints (pt.)	= 1 quart	(qt.)
8 quarts	= 1 peck	(pk.)
4 pecks	= 1 bushel	(bu.)
1 bushel	= 2150.42 cubic inches	

AVOIRDUPOIS WEIGHT

16 ounces (oz.)	= 1 pound	(lb.)
2000 pounds	= 1 ton	(T.)

LINEAR MEASURE

12 inches (in.)	= 1 foot	(ft.)
3 feet	= 1 yard	(yd.)
5½ yards, or 16½ feet	= 1 rod	(rd.)
320 rods, or 5280 feet	= 1 mile	(m.)

SQUARE MEASURE

144 square inches (sq. in.)	= 1 square foot	(sq. ft.)
9 square feet	= 1 square yard	(sq. yd.)
30¼ square yards, or 272¼ square feet	= 1 square rod	(sq. rd.)
160 square rods	= 1 acre	(A.)
640 acres	= 1 square mile	(sq. m.)

SOLID OR CUBIC MEASURE

1728 cubic inches (cu. in.)	= 1 cubic foot	(cu. ft.)
27 cubic feet	= 1 cubic yard	(cu. yd.)

WOOD MEASURE

16 cubic feet	= 1 cord foot	(cd. ft.)
8 cord feet, or 128 cubic feet	= 1 cord	(cd.)

TIME MEASURE

60 seconds (sec.)	= 1 minute	(min.)
60 minutes	= 1 hour	(hr.)
24 hours	= 1 day	(da.)
7 days	= 1 week	(wk.)
365 days	= 1 common year	(c. yr.)
366 days	= 1 leap year	(l. yr.)
100 years	= 1 century	(C.)

MISCELLANEOUS TABLES

12 units	= 1 dozen
12 dozen	= 1 gross
20 units	= 1 score
24 sheets	= 1 quire
20 quires	= 1 ream

SUMMARY FOR WORK OF PART II

I. What the pupil should know at the end of this part.

1. In Notation and Numeration:

(1) The names and meanings of the digits.
(2) The number names to 1000.
(3) How to read and write three-digit numbers.

2. In Addition and Subtraction:

(1) The meaning of the symbols +, −, and = as short-hand for the words *and*, *less*, and *is* or *are*.
(2) How to show sums and differences in symbols.
(3) The meanings of add, subtract, sum, difference.
(4) How to arrange work in addition and subtraction
(5) The forty-five fundamental addition facts.
(6) How to add and subtract three-digit numbers.
(7) How to add longer columns of one-digit, and shorter columns of two- and three-digit numbers.
(8) How to check subtractions by addition.
(9) Correlation of addition and subtraction, as 8+5 = 13, with 13 − 8 = 5, and 13 − 5 = 8.

3. In Multiplication and Division:

(1) The meanings of ×, ÷,)__, and the words and phrases: *times*, *multiply*, *divide*, *multiplied by*, *divided by*, and *product*.
(2) How to show multiplication- and division-problems in symbols.
(3) How to arrange work for multiplication and for short division.
(4) The multiplication tables through the tens.
(5) How to multiply, and to divide two- and three-digit numbers by one-digit numbers and by 10.
(6) How to check divisions by multiplication.
(7) Correlation of multiplication and division, as 4×8, or 8×4 = 32, with $\frac{1}{8}$ of 32 = 4, and $\frac{1}{4}$ of 32 = 8.
(8) How to write remainders in division as fraction.

4. In Fractions:

(1) The meaning of halves, thirds, fourths, to tenths and the forms: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{3}{4}$, to $\frac{1}{10}$, $\frac{3}{10}$, $\frac{9}{10}$, $\frac{10}{10}$.
(2) The meaning of fractional parts of a number as division by the denominators, as $\frac{1}{3}$ of 12 = 12 ÷ 3.
(3) Amounts of money written decimally as dollars and decimals of a dollar, to two places.

5. In Mensuration:

(1) The connection of square and linear units in measuring areas of oblongs.
(2) How to find areas of oblongs having integral dimensions.
(3) The names and ideas of the more common standards for measuring distances, areas, boxes, liquids, bulks, weights, time, and value.

6. In Form-Study:

(1) Comparative lengths of lines.
(2) Making and measuring squares and oblongs.
(3) Marking, cutting, and making boxes of simple forms.
(4) Rectangular forms used in building the tables.
(5) Meaning of terms, area, dimension, base, altitude, and perimeter.

II. Ideas and values of arithmetic work started and practiced by the pupil.

1. Forming estimates and judgments of relative magnitudes.
2. Practicing measurement as a means of checking and correcting judgments of magnitudes.
3. Forming the habit of doing *mentally* as much of the work as possible.
4. Forming the habit of sketching and picturing number relations to obtain clear and vivid ideas.
5. Learning in arithmetic how to study.
6. Checking calculations to cultivate independence and self-confidence.
7. Using rectangular groups of squares in building tables, incidentally foreshadowing and aiding in mensuration.
8. Coming first into possession of ideas with the minimum of nomenclature.
9. Sensing addition, subtraction, multiplication, and division as measuring processes; and their relationships.

III. Concepts and meaning of other terms learned incidentally through use.

1. Inch, foot, yard, square inch, square foot, square yard, cubic inch, ounce, pound, gill, pint, quart, gallon, peck, bushel, hour, minute, second, and names of common coins.

SUMMARY FOR WORK OF PART III

I. What the pupil should know at the end of this part.

1. In Notation and Numeration:

(1) The meaning of first-place, second-place, etc.
(2) The meaning of place-value.
(3) How to read and to write four- five-, and six-digit numbers.
(4) How to read, write, and use the Roman numerals of the clock-face.
(5) Decimal point as used in writing amounts of money.

2. In Addition and Subtraction:

(1) When to add and to subtract in problems not too difficult.
(2) How to add and to subtract all sorts of whole numbers, and simple common fractions, and mixed numbers.
(3) Enough to solve addition and subtraction problems under reasonable time limitations.
(4) The reason that addition checks subtraction.
(5) The meaning of the terms *sum, difference, minuend,* and *subtrahend.*
(6) How to find totals and to check footings with tables of data.

3. In Multiplication and Division:

(1) The meanings of *times, multiplicand, multiplier, product, dividend, divisor, quotient,* and *remainders* in both subtraction and division.
(2) How to multiply and to divide quickly by multiples of 10, 100, 1000.
(3) How to find the products and the quotients of easy fractions by one- and two-digit numbers, and to show the results diagrammatically.
(4) The multiplication table through the twelves automatically.
(5) The division facts that are the correlates of the products of the multiplication table.

(6) How to find readily results of such as $\frac{1}{2}$ of 4 = ? $\frac{1}{2}$ of $\frac{1}{3}$ = ? $\frac{3}{4}$ of 8 = ? foreshadowing multiplication of fractions.

(7) How to multiply and to divide by small whole numbers amounts of money written as dollars and decimals of a dollar, foreshadowing decimals proper.

(8) How to use the correlation of multiplication and division in checking, as 10 6's by 6 10's, and $570 \div 38 = 15$ by $38 \times 15 = 570$, etc.

(9) How to work problems in long division.

4. In Fractions:

(1) Meaning of fractions and of fractional operations pictured and diagrammed.

(2) Beginnings of adding, subtracting, and multiplying fractions.

(3) How to use simple fractions in every-day problems, including amounts of money expressed in dollars and decimals of a dollar.

(4) How to use fractions in connection with simple scale-drawings.

5. In Mensuration:

(1) How to find the areas of rectangles having integral dimensions.

(2) How to find the areas of forms that can be expressed in rectangular parts.

(3) The connection between the areas of a triangle and of a rectangle having the same base and altitude.

(4) How to find the area of simpler forms of triangles from their bases and altitudes.

(5) How to solve problems in which the area and one dimension of a rectangle are given to find the unknown dimension.

(6) The terms and forms of the square, the rectangle, and the triangle.

(7) The new ideas and words: for time,—names of months and seasons; for distance,—the rod, and the mile; for areas,—the square rod and square mile; for liquids,—the barrel; the standard abbreviations of all units used in both Parts I and II, and the use of P.M and A.M. for after noon and before noon.

6. In Form Study:

(1) Simple scale drawing.
(2) How to represent in scale drawings, home or school garden plots and their subdivisions.
(3) How to compute areas of actual tracts from simple scale-drawings.
(4) How to picture products into rectangles.
(5) How to measure the areas of the rectangular and the triangular forms.
(6) How to divide drawings into triangular parts.

II. Ideas and values of arithmetical study advanced, or begun, by the work of Part III.

1. Estimating and judging of relative magnitudes.
2. Training in independence by checking work, and guaranteeing results.
3. Fostering the habit of working *mentally* until *pencil* is needed, and impressing pupil to use pencil *to aid* the head.
4. Impressing pupil with out-of-school needs for arithmetic through pages of unified problems dealing with the child's interests.
5. Training in recognizing when to add, to subtract, to multiply, and to divide by simple problems calling for more than one process.
6. Use of means of *re*-presentation as well as of presentation.
7. Making deeper and readier the pupil's hold on the tables.
8. Opening the pupil's eyes to number demands all around him.
9. Power to deal systematically and intelligently with lists of numerical data.
10. Extent of Great Lakes' region.
11. How number is needed in the work of transporting salt, hinting at its uses in other industries.
12. Strengthening the pupil's feeling of confidence in his growing power to do arithmetical problems, inspired by his command of the tables.
13. Impressing the pupil that school-work in arithmetic is making him stronger to deal with out-of-school problems.
14. Heightening the natural interest, that is manifest at this period in the formal side of number-work.

SUMMARY FOR WORK OF PART IV

I. What the pupil should know at the end of this part.

1. In Notation and Numeration:

(1) How to read and to write nine-digit whole numbers.
(2) How to read and to write common fractions with one- and two-digit terms.
(3) How to read, and to write decimal numbers to hundredths.
(4) How to write, and to interpret numbers in Roman numerals.
(5) How to write and to read denominate numbers involving two or three denominate units.

2. In Addition and Subtraction:

(1) How to analyze and to solve problems on motion involving two or more operations with whole and simple fractional numbers.
(2) How to add and to subtract whole numbers, common fractions with one- and two-digit numerators, and decimal numbers to hundredths.
(3) How to add and to subtract denominate numbers, involving three denominate units or less.
(4) How to foot and to balance simple bills.
(5) How to check addition by adding in a changed order, and how to check subtraction by addition.
(6) The terminology of addition and subtraction.

3. In Multiplication and Division:

(1) How to multiply all sorts of whole numbers and how to divide whole numbers with one-, two-, and three-digit divisors.
(2) How to multiply and to divide such fractional and decimal numbers as he can read.
(3) How to multiply and to divide denominate numbers by whole numbers.
(4) How to obtain areas from dimensions, and dimensions from areas, etc., of rectangles, parallelograms, and triangles.
(5) How to multiply mentally by numbers larger than 12 and how to recognize readily factors to 10 of two- or three-digit composite numbers.
(6) How to multiply by 10, or 100, or 1000, by shifting the decimal point.

(7) How to check division by multiplication.
(8) The terminology of multiplication and division.
(9) How to recognize factors and products of multiplication table quickly.

4. In Common Fractions:

(1) How to add, subtract, multiply, and divide simple fractional values of distances, areas, etc.
(2) How to handle readily the numbers $12\frac{1}{2}$ and $16\frac{2}{3}$ as parts of 100, etc., in many practical uses and applications.
(3) How to picture and how to figure without the picture with fractions with one- and two-digit terms.
(4) Necessary parts of the terminology of common fractions.
(5) How to use cancellation intelligently in multiplying and reducing fractions.

5. In Decimal Fractions:

(1) How to read, write, add, subtract, multiply, and divide decimals to hundredths.
(2) How to express easier fractions and percents as decimals, and *vice versa*.
(3) How to place the point intelligently in sums, differences, products, and quotients with decimals containing one or two places.
(4) How to multiply or divide by 10, or 100, or 1000, by shifting the decimal point.

6. In Mensuration and Scale Drawing:

(1) How to make and to read scale drawings.
(2) Areas of rectangles, parallelograms, and triangles in sq. ft., sq. yd., sq. rd., and sq. mi.
(3) How to apply simple scales to drawings to ascertain actual dimensions, areas, etc., of the objects represented.
(4) How to find unknown parts of areas, objects, etc., from data given in denominate units.
(5) How to use the square and rectangle to picture operations with fractional numbers.

7. In Percentage:

(1) How to read and to write percents.
(2) How to indicate percents, and to express simpler percents in their fractional or decimal equivalents.

(3) How to find simple percents of magnitudes and of numbers, as so many 100ths of the magnitude or number.
(4) How to picture certain percents of squares, rectangles, and circles.
(5) How to find the *base*, and how to find the *rate*, in easy exercises.
(6) Necessary terms of percentage.

8. In Compound Numbers.

(1) How to write, read, add, subtract, multiply, divide, and reduce easier denominate numbers, expressed in three units, or less, in problems in distance, area, capacity, bulk, weight, time.
(2) About how large, how heavy, etc., the denominate units are.

II. Ideas and Values of arithmetical study advanced by the work of Part IV.

1. Power to know when to add, subtract, multiply, or divide.
2. Power to estimate quickly what results will be.
3. Power to apply the arithmetical operations to the better understanding or appreciation of lists of interesting and useful number facts.
4. Ability to recognize the call for arithmetic in practical affairs.
5. Increased power of self-reliance engendered through habitual checking and proving of result.
6. Feeling of growing power and skill engendered through well-timed drill exercises.
7. Gradual increase in number insight fostered through the habit of "answering all you can orally," of "using the pencil only when needed."
8. Heightening the interest through the continual interplay of the insight, developed through drill exercises, and the conscious feeling of power to do things worth while, developed through problems dealing with the appreciably real.
9. Fostering the disposition to understand, and to challenge what is hazy, or doubtful, by continual insistence upon reasons, checks, and proofs of results and work.
10. Strengthening the power of concentration through brief topical studies, and through single pages now and then, of unified problems, dealing with out-of-school interests that call for all the arithmetical operations.